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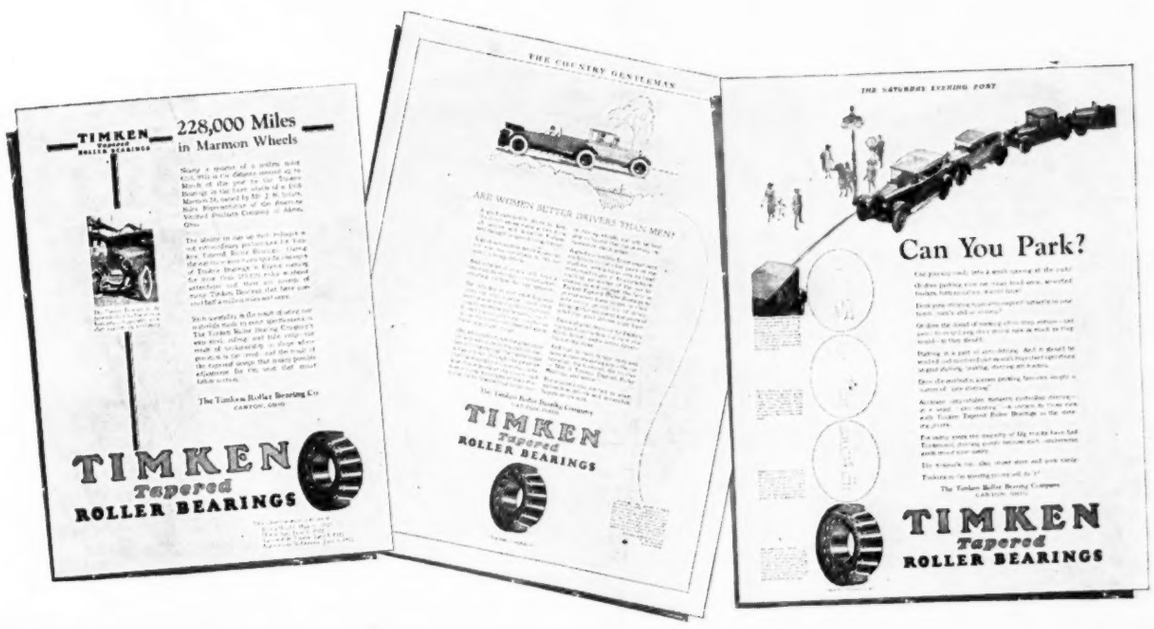

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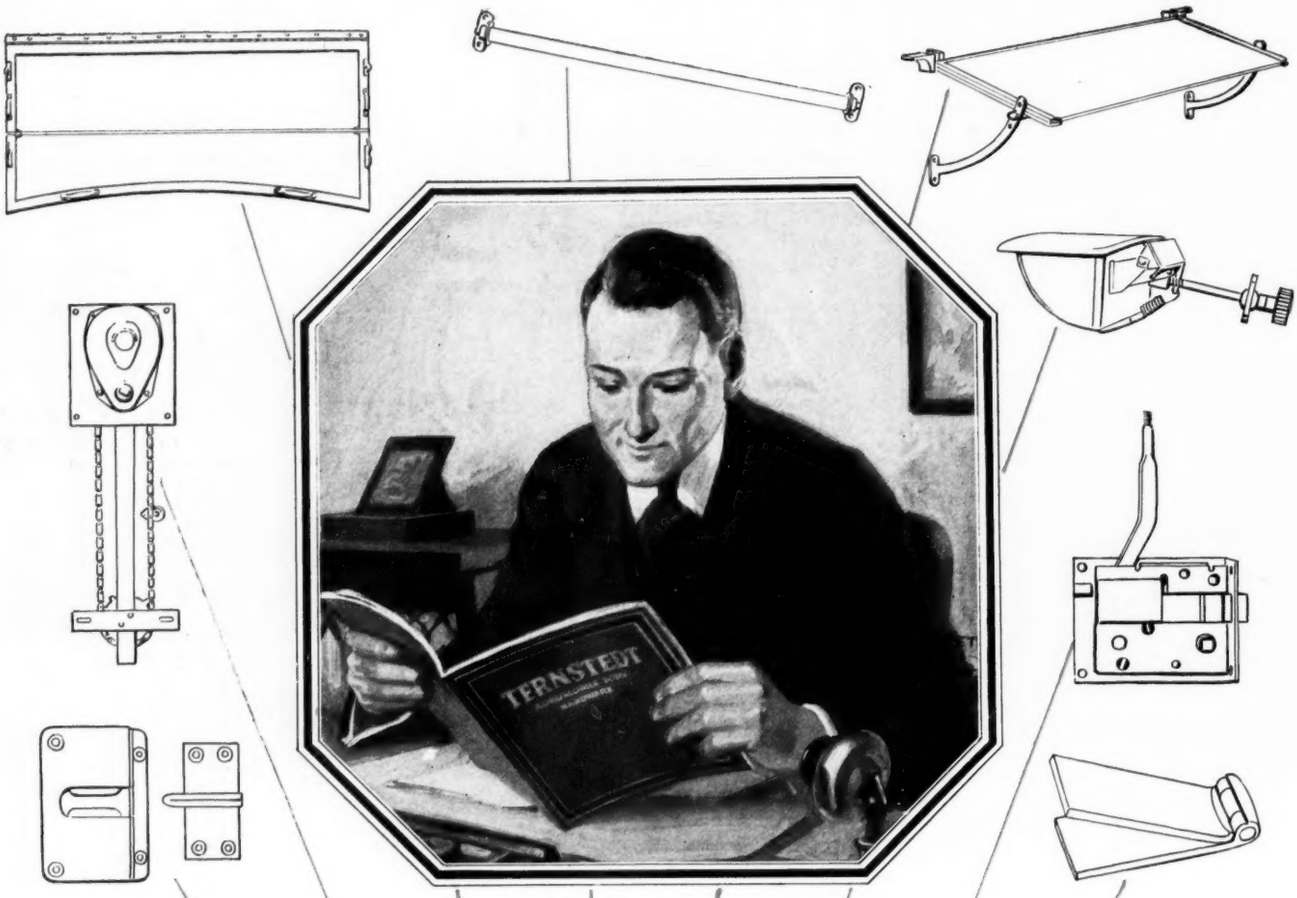

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AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XLVII. NEW YORK—THURSDAY, JULY 27, 1922 No. 4

10,608,127 Cars and Trucks Registered on July 1, 1922

Gain of 1,350,552 over 1921 mid-year figures. Increase is 14.6 per cent. Fees collected jump $27,390,364. One car for every 10.16 persons. New York has highest total, but California records greatest numerical gain. Motorcycle registrations drop.

ON July 1, 1922, there were 1,350,552 more cars and trucks in the United States than on July 1, 1921. This is a gain of 14.6 per cent over the mid-year figure of 1921 and indicates that the final 1922 statistics will record another marked increase in motor vehicle registrations. Already the Dec. 31, 1921, total of 10,505,660 has been exceeded by 102,467. Thus, all the registrations made during the last six months of this year will represent an increase over the 1921 total.

Ten million six hundred and eight thousand one hundred and twenty-seven cars and trucks were registered in the United States on July 1, 1922. Fees collected have totaled $125,052,346, an increase of $27,390,364 over July 1, 1921. There is now one motor vehicle for every 10.16 persons in the United States, using July 1, 1921, population estimates as a basis.

New York maintains its place at the top of the list with 812,138 cars and trucks, while Ohio is found as usual in second place with 760,000.

The largest gain over July 1, 1921, is recorded by New York, which shows an increase of 161,608. The largest percentage gain for the same period has been made by the District of Columbia, which jumped up 48 per cent. Tennessee follows with an increase of 35 per cent.

1922 HAS been a remarkable production year for the automobile industry. Some people have even been asking, "Where are all the cars going?"

* * *

This article gives the answer to that question. It contains the results of mid-year survey of registrations which has just been completed by AUTOMOTIVE INDUSTRIES.

* * *

The results are gratifying to the automotive industry. They indicate marked progress over last July.

Six states show a smaller registration than last year at this time. Those which dropped were New Mexico, Wyoming, West Virginia, South Dakota, Utah and South Carolina. The total registration loss in these states, however, is only 13,093, so that the net gain over last July is not materially affected.

A very large number of states, however, have failed to reach a point as high as that of the final Dec. 31 registrations of 1921. More than half of the states, in fact, are still below the 1921 total. This has not usually been the case, although a similar situation prevailed last year in July. Despite that fact all but four states recorded gains before the final count in December.

The first six months of 1922 have witnessed a remarkable industrial comeback from one of the worst

depressions the country has ever had. Farmers have been doing better this year, but have had many debts to liquidate. For this reason it is probable that registration officials have been more ready than usual to allow the farmer considerable leeway.

In some states the practice has always been to refrain from enforcing the registration law in agricultural districts until late in the year when the crops have been harvested. This year, because of the unusual economic conditions, it is logical to assume that this practice has been more widespread.

Since nearly all of the state registration years run from January to January, however, the only figures with which the July 1, 1922 figures can be properly compared are the July 1, 1921 figures. On this basis, a gain of nearly a million and a half vehicles is recorded and marked progress is shown in all parts of the country.

A study of the table showing percentage gains and losses in registration gives some interesting facts in answer to the perennial "saturation point" arguments.

The largest percentage of gain in registration has been made in those states which already had the largest number of vehicles. New York, Ohio, California, Pennsylvania, Indiana, New Jersey—all high registration states—each show an increase of more than 15 per cent over last July. In fact, New York, which has more cars than any other state, gained more than any of the others mentioned, having an increase of 24.8 per cent.

Iowa, which had the greatest number of cars per person in 1921, shows a gain of 8.2 per cent over last July.

No radical changes have taken place in the relative position of the states as regards total registrations. The rise of California from fifth to second place in the list is the most prominent. Last year at this time, Pennsylvania occupied second place, but now drops to third through the large gains made by the Golden Gate State.

At the other end of the list, Delaware has moved up a peg from next to last place, putting New Mexico next to the bottom. Nevada, of course, still has the lowest registration.

The Southern states made distinct gains during the last year. The first four states in the list of percentage

Registration of Motor Vehicles

State	Total Net Registration	Non-Resident Registrations and Transfers	Passenger Cars	Commercial Cars	Motorcycles	Total Fees
Alabama	87,129	727	77,509	9,620	598	$1,215,414
Arizona	32,847	2,018	.....	.....	185	202,544
Arkansas	74,947	.....	67,900	7,047	192	900,000
California	722,853	.....	689,163	33,690	14,299	7,219,160
Colorado	145,000	.....	136,000	9,000	2,100	900,000
Connecticut	127,773	10.810	105,560	22,213	2,144	3,155,701
Delaware	21,800	.....	.....	.....	338	384,727
District of Columbia	78,055	.....	69,496	8,559	2,357	347,153
Florida	105,029	2,470	87,838	17,191	1,287	1,400,000
Georgia	126,500	1,071	112,000	14,500	877	1,702,797
Idaho	47,094	524	.....	.....	601	725,000
Illinois	676,748	.....	591,437	85,311	6,063	7,193,861
Indiana	425,000	.....	380,000	45,000	5,152	2,734,403
Iowa	460,069	.....	431,798	28,271	3,089	7,315,221
Kansas	288,742	4,937	269,065	19,677	1,714	146,128
Kentucky	129,100	.....	114,307	14,793	841	1,952,422
Louisiana	83,624	.....	70,940	12,684	395	1,609,850
Maine	77,419	.....	66,307	11,112	1,073	1,184,390
Maryland	130,631	6,802	120,776	9,855	3,752	2,338,765
Massachusetts	367,706	30,370	310,003	57,703	9,064	4,588,038
Michigan	493,246	41,696	442,055	51,191	4,199	6,825,118
Minnesota	336,000	17,576	304,000	32,000	2,500	6,013,275
Mississippi	63,420	12,300	58,420	5,000	135	1,494,990
Missouri	338,426	.....	303,756	34,670	.....	3,039,317
Montana	55,700	313	49,850	5,850	251	540,133
Nebraska	216,902	7,408	198,717	18,185	1,101	2,670,827
Nevada	10,544	.....	.....	.....	80	97,114
New Hampshire	42,608	.....	.....	.....	1,493	823,165
New Jersey	287,859	24,876	216,418	71,441	7,364	5,457,151
New Mexico	20,207	.....	18,457	1,750	107	180,000
New York	812,138	.....	630,883	181,255	27,000	9,124,024
North Carolina	162,942	.....	147,488	15,454	.....	.....
North Dakota	88,719	3,800	86,354	2,365	584	613,990
Ohio	760,000	38,200	650,000	110,000	17,000	6,342,628
Oklahoma	187,000	.....	.....	.....	504	2,143,705
Oregon	108,779	8,169	96,465	12,314	2,424	2,973,378
Pennsylvania	716,644	49,728	660,262	56,382	15,704	11,046,479
Rhode Island	51,406	4,768	41,510	9,896	1,337	510,000
South Carolina	84,449	.....	77,833	6,616	497	.....
South Dakota	111,447	.....	103,731	7,716	485	672,152
Tennessee	117,000	6,300	103,000	14,000	1,000	1,386,000
Texas	449,436	58,954	.....	.....	2,833	3,630,840
Utah	40,700	.....	34,800	5,900	565	645,815
Vermont	37,452	1,727	35,276	2,176	669	680,741
Virginia	150,000	.....	130,000	20,000	1,500	2,000,000
Washington	181,762	9,706	154,340	27,422	2,788	2,980,017
West Virginia	90,250	3,758	86,200	4,050	950	1,832,267
Wisconsin	357,968	.....	333,754	24,214	4,813	3,821,512
Wyoming	27,057	.....	24,223	2,834	253	292,134
TOTALS	10,608,127	349,008	8,687,891	1,128,907	154,257	$125,052,346

CAR AND TRUCK REGISTRATIONS

New York	812,138
Ohio	760,000
California	722,853
Pennsylvania	716,644
Illinois	676,748
Michigan	493,246
Iowa	460,069
Texas	449,436
Indiana	425,000
Massachusetts	367,706
Wisconsin	357,968
Missouri	338,426
Minnesota	336,000
Kansas	288,742
New Jersey	287,859
Nebraska	216,902
Oklahoma	187,000
Wtshington	181,762
North Carolina	162,942
Virginia	150,000
Colorado	145,000
Maryland	130,631
Kentucky	129,100
Connecticut	127,773
Georgia	126,500
Tennessee	117,000
South Dakota	111,447
Oregon	108,779
Florida	105,029
West Virginia	90,250
North Dakota	88,719
Alabama	87,129
South Carolina	84,449
Louisiana	83,624
District of Columbia	78,055
Maine	77,419
Arkansas	74,947
Mississippi	63,420
Montana	55,700
Rhode Island	51,406
Idaho	47,094
New Hampshire	42,608
Utah	40,700
Vermont	37,452
Arizona	32,847
Wyoming	27,057
Delaware	21,800
New Mexico	20,207
Nevada	10,544
	10,608,127

gains are all located below the Mason-Dixon line, while six out of the first dozen are in this group.

There is a marked absence of agricultural states near the top of the list either in percentage of gain or actual gain in registration. In both of these lists, Minnesota is the first agricultural state to appear. It is 16th in the list of percentage gains and 11th in the list of actual registration increases.

With increased registration has come an increase in the amount of fees paid by motorists. Up to July 1, 1922, car and truck operators had paid into the state treasuries a total of $125,052,346, an increase of $27,390,364 over the sum collected during the first half of 1921. Thus, while motor vehicle registrations increased about 15 per cent, the registration fees collected increased about 28 per cent.

This analysis shows that motorists are paying more per car in registration fees than in previous years. The increased total revenue thus collected by the states can properly be used for highway maintenance, so that motor vehicle traffic can operate efficiently and economically throughout the country.

Motorcycle registrations are less than on July 1, 1921, by some 8000. Motorcycle registrations have increased in only eight states, losses being shown in every other case. Ohio has registered the largest gain with 5339, while Pennsylvania shows the greatest loss with 2470. New York is the only state except Ohio to register any material gain in motorcycle registration, the other gains being very small.

January 1-July 1 Comparisons

An examination of the July 1, 1922, figures in relation to the Dec. 31, 1921, totals is of limited value, since the figures are not properly comparable. The Dec. 31 figures represent a high total for the year, while the July 1 figures merely tell how many cars have been registered in half a year.

The fact that the July 1 total in a given state is less than the total for the same state on the previous Dec. 31 is no indication whatever that the number of cars in that state has actually fallen off. This condition of registration figures may prevail when there are actually more cars operating in the state on July 1 than at the end of the previous year. The difference in registration in such a case may indicate simply the degree of law enforcement in the particular state during early months of year.

When a state on July 1 has passed the total of the previous December, however, there is certain to be an increase for the year in that state. These facts should be clearly understood in comparing the July 1 figures with the totals for the previous year.

As an indication of how lax law enforcement affects registration figures, the following paragraph from a letter just received from the research bureau of the Oklahoma City *Times* is of interest:

"In Oklahoma the motor vehicle register law is not rigidly enforced and for this reason it is practically impossible to tell exactly at this time the number of cars in the state."

Twenty-three states have already registered more cars than were recorded on Dec. 31, 1921. California has passed last year's total by 49,023, while eight other states have ex-

PERCENTAGE GAINS AND LOSSES IN REGISTRATION
July 1, 1921—June 30, 1922

Gains:	
District of Columbia	48.8
Tennessee	35.1
Arkansas	28.5
Virginia	25.0
New York	24.8
Indiana	23.2
California	22.7
Massachusetts	22.6
Ohio	21.9
New Jersey	21.3
Kentucky	20.1
Louisiana	17.8
Pennsylvania	17.6
Alabama	17.6
Maine	17.3
Florida	17.1
Delaware	15.9
Maryland	15.7
New Hampshire	14.8
Vermont	14.3
Minnesota	14.0
Washington	13.9
Wisconsin	13.4
Michigan	13.3
Mississippi	13.0
Illinois	12.6
Missouri	10.7
Rhode Island	10.4
North Carolina	10.2
Colorado	9.4
Nevada	9.0
Connecticut	8.2
Iowa	8.2
Montana	8.2
Texas	7.5
Georgia	6.6
Oregon	6.4
Arizona	5.4
North Dakota	2.8
Oklahoma	2.2
Idaho	2.1
Kansas	.47
Nebraska	.46
Losses:	
New Mexico	15.3
Wyoming	9.8
West Virginia	4.5
South Dakota	1.5
Utah	1.1
South Carolina	.22
Average Gain for U. S.	14.8 per cent

GAINS AND LOSSES IN REGISTRATION
July 1st, 1921-June 30, 1922

Gains:	
New York	161,608
Ohio	136,684
California	133,990
Pennsylvania	107,376
Indiana	80,110
Illinois	75,766
Massachusetts	67,679
Michigan	57,738
New Jersey	50,520
Wisconsin	42,194
Minnesota	41,295
Iowa	34,713
Missouri	32,624
Texas	31,310
Tennessee	30,390
Virginia	30,000
Distrcit of Columbia	25,671
Washington	22,183
Kentucky	21,607
Maryland	17,726
Arkansas	16,666
Florida	15,331
North Carolina	15,032
Alabama	13,053
Louisina	12,624
Colorado	12,500
Maine	11,429
Connecticut	9,663
Georgia	7,848
Mississippi	7,306
Oregon	6,505
New Hampshire	5,517
Rhode Island	4,832
Vermont	4,694
Montana	4,200
Oklahoma	4,000
Delaware	3,000
North Dakota	2,409
Arizona	1,672
Kansas	1,351
Nebraska	993
Idaho	964
Nevada	872
	1,363,645
Losses:	
West Virginia	4,200
New Mexico	3,658
Wyoming	2,943
South Dakota	1,673
Utah	436
South Carolina	183
	13,093
Net gain	1,350,552

ceeded the 1921 mark by more than 10,000.

Only three states show a decrease of more than 10,000, these heavy losses being in Oklahoma, Nebraska and Texas, as follows:

Oklahoma	34,300
Nebraska	21,802
Texas	18,180

The unreliable character of the mid-year figures in Oklahoma has already been indicated. In the remaining twenty-three states which have not yet reached the 1921 total, the decreases are so small as to be negligible in relation to the total registration for the state. It is safe to predict that at least twenty-three, and probably the entire twenty-six, states, will surpass the 1921 total before Dec. 31, 1922.

Fifty-three thousand six hundred and seventy-three motorcycles will have to be registered during the last half of 1922 if the total registrations for this year are to finally equal those of 1922. The 1921 total was 207,930, which was a decrease of about 24,000 from 1920.

The automobile industry needs better registration figures, if the data gathered are to be of maximum value. A uniformity of state laws is highly desirable, and the industry should take an active part in a movement to obtain the necessary improvements in present methods.

The possibilities along this line are well illustrated by the type of registration data available in New York, Connecticut, Massachusetts and several other states where the figures are segregated sufficiently to provide useful material for sales analysis.

Uniform Registration Needed

Even those states which have well worked out registrations systems, however, have different systems in each case, so that a correlation of the figures for the various states is impossible in any detailed form.

General improvement has been steady, though slight, during the last few years. In Minnesota, for example, it is now possible to get annual registration figures which give with a reasonable degree of accuracy the number of cars and trucks operating in the state.

Passenger car and truck figures are now segregated in all but seven states, so that some general idea as to the number of commercial vehicles can be obtained. In this connection, however, it should be pointed out that the definition of "truck" or "commercial vehicle" differs in almost every state, so that the segregated figures are useful only in a very general way.

The registration records in all the states are not so arranged that exact totals can be given at any time. In some states, such totals are not available even for the half year period.

Consequently, some of the figures included in the accompanying tables are not altogether exact. The mid-year figures are never quite so accurate as the year end figures, because at the end of the year practically every state compiles totals for its own purposes.

Tractors and trailers are registered in some states, but the data available on these vehicles is still too meager to make it worth including in a semi-annual summary of this character. Moreover, in certain instances, tractors and trailers are included in the truck or commercial vehicle registrations.

PERCENTAGE GAINS AND LOSSES IN REGISTRATION
January 1, 1922—June 30, 1922

Gains:	
District of Columbia	26.4
Arkansas	11.1
North Carolina	9.6
Florida	7.4
California	7.3
Virginia	6.4
Indiana	6.2
Alabama	5.6
Ohio	5.5
New Jersey	5.4
Wisconsin	4.7
Pennsylvania	3.9
Louisiana	3.8
Michigan	3.4
Minnesota	2.2
Kentucky	2.2
Massachusetts	1.9
Delaware	1.8
Wyoming	1.6
New Hampshire	1.4
Vermont	1.3
Illinois	.94
New York	.01
Losses:	
New Mexico	18.2
Oklahoma	15.5
Utah	14.4
Nebraska	9.1
Idaho	8.2
Oregon	8.1
Connecticut	7.1
Maryland	7.1
South Carolina	6.7
South Dakota	6.6
Rhode Island	6.5
Arizona	6.3
Montana	5.2
North Dakota	4.2
Georgia	4.2
West Virginia	3.9
Texas	3.9
Nevada	3.5
Mississippi	2.6
Missouri	2.3
Washington	2.0
Kansas	.88
Colorado	.50
Maine	.13
Iowa	.10
Tennessee	.02
Average Gain for U. S.	per cent

GAINS AND LOSSES IN REGISTRATION
January 1 to June 30, 1922

Gains:	
California	49,023
Ohio	39,368
Pennsylvania	27,055
Indiana	24,658
District of Columbia	16,310
Michigan	16,209
Wisconsin	16,127
New Jersey	14,865
North Carolina	14,258
Virginia	9,000
Arkansas	7,501
Minnesota	7,300
Florida	7,192
Massachusetts	6,974
Illinois	6,314
Alabama	4,786
Louisiana	3,124
Kentucky	2,729
New Hampshire	569
Vermont	487
Wyoming	438
Delaware	387
New York	107
	274,781
Losses:	
Oklahoma	34,300
Nebraska	21,802
Texas	18,180
Maryland	9,941
Connecticut	9,753
Oregon	9,546
Missouri	8,011
South Dakota	7,827
Utah	6,823
South Carolina	6,097
Georgia	5,442
New Mexico	4,496
Idaho	4,200
North Dakota	3,925
West Virginia	3,644
Washington	3.597
Rhode Island	3,551
Montana	3,085
Kansas	2,567
Arizona	2,202
Mississippi	1,719
Colorado	739
Iowa	459
Nevada	275
Maine	108
Tennessee	25
	172,314
Net gain	102,467

MOTORCYCLES
Gains and Losses, July 1, 1921 to June 30, 1922

Gains:	
Ohio	5,339
New York	4,420
Minnesota	500
District of Columbia	389
Tennessee	155
Florida	134
Arkansas	60
Mississippi	13
	11,010
Losses:	
Pennsylvania	2,470
Connecticut	2,441
Kansas	1,684
Illinois	1,551
Michigan	1,053
Massachusetts	949
New Jersey	931
California	862
Oklahoma	696
Wisconsin	692
Indiana	587
Texas	454
New Hampshire	401
Iowa	377
Nebraska	314
Maryland	310
Virginia	300
West Virginia	300
Utah	227
Kentucky	193
Arizona	191
Rhode Island	187
South Carolina	187
Georgia	179
Vermont	174
Delaware	162
South Dakota	140
Washington	136
Idaho	133
Montana	119
Louisiana	95
Maine	95
North Dakota	92
Oregon	62
New Mexico	47
Nevada	45
Colorado	40
Wyoming	29
Alabama	23
	18,928
Net loss	7,918

Numerous Changes in 1923 Buick Chassis and Body Models

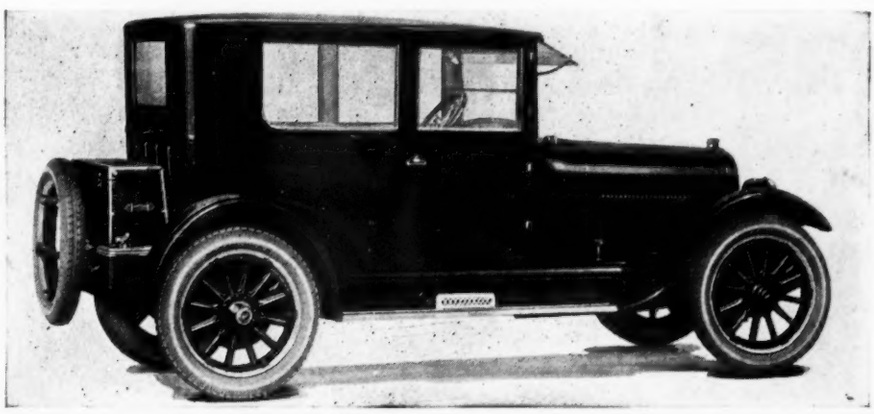
Engine partially redesigned to make it quieter and more durable. Aluminum and steel combined in push rods to reduce clearance at high temperatures. Two touring-sedans are added to present line. All bodies are lower than formerly. Prices not yet announced.

By J. Edward Schipper

FOR 1923 the Buick line will consist of fourteen passenger car models, on the six and four-cylinder chassis, and the four-cylinder special delivery truck. Two of the passenger car bodies are new. These are touring-sedans, one being mounted on the six-cylinder chassis and the other on the four.

While fundamentally this is the same line which was on the market in 1922, there are a great many changes of major as well as of minor importance in both the chassis and bodies. Material changes have been made throughout the entire line from an appearance standpoint, and mechanically, although there have been no radical changes, there have been a remarkable number of detail refinements to promote durability, silence and absence of minor mechanical difficulties. With the sport and touring-sedan bodies, which have been added recently, the Buick line now offers a choice of nine bodies on the six-cylinder chassis, which is made in two wheelbases to accommodate the different body styles, five bodies on the standard four-cylinder chassis, which is made in one wheelbase and six body choices on the special delivery truck models mounted on the four-cylinder chassis.

The Buick six-cylinder models have been greatly improved from the standpoint of appearance, riding qualities and durability. All of the models on this chassis have been lowered approximately three inches. The lowering has been accomplished by a modification of the spring suspension by which the offset of the cantilever spring has been increased 4 in., making the forward end of the spring 14 in. longer than the rear. This has resulted not only in lowering the car, but also in reducing rebound and eliminating side sway. An important series of changes which has resulted in the underwriters' insurance rating of Class A, has been obtained by fitting a transmission lock, providing a drip bowl under carbureter, extra clips on the gasoline feed line and tail lamp wires and flexible steel covers for the three wires leading from the generator to the switch and the rounding of corners on all covers for wires.



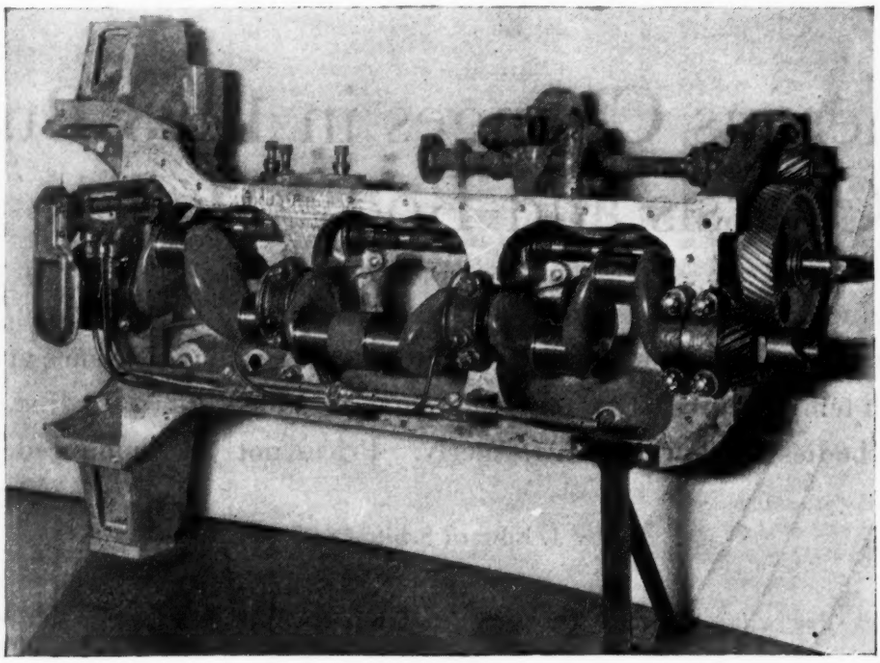
One of the two new Buick five-passenger touring-sedan models. The trunk is included as standard equipment

Improvements have been made in the six-cylinder engine by lengthening the pistons one-half inch above the wrist pin, lengthening the connecting rod 1 3/16 in. and raising the entire block by the amount corresponding to the sum of these two, or 1 11/16 in. so that the compression remains the same with the longer piston and connecting rod. This has been done to eliminate piston slap and to minimize wear on piston walls. To further increase the life of the cylinder bore, the new pistons are machined with a tapered relief. There is no longer a guide ring at the bottom of the piston, the skirt being plain at this point. The pistons no longer over-run the bottom of the cylinder.

The chilling of the cylinder bores is something new in foundry practice so far as cylinders are concerned. It is done to neutralize the natural annealing process which takes place in the part of the casting surrounded by water jackets. Cooling at this part of the cylinder is much slower, with the result that the castings are generally softer at this portion of the bore. As this is the portion subjected to the greatest wear by the pistons, softness is an objectionable feature. By the chilling process, which will be described in detail in the near future, this part of the casting is cooled just as quickly as the remainder. The result is a harder casting, although one which is readily machined since the hard spots are not localized. The bores are finally finished by honing. The honing tool, which finally finishes these bores, is similar to a

reamer, except that it has honing stones in place of the reaming cutters.

The crankshaft is now 2¼ in. in diameter and harder babbitt is used in both the connecting rods and main bearings. Individual pressure feed-pipes are now brought from the oiling system to the center main bearing and the main bearing caps are drop forged with the babbitt tinned directly to the caps. To render lubrication of the pistons more certain at high speed, the oil troughs are covered to retain a supply of lubricant.



Under side of the crankcase of the new Buick six, showing piping for supplying oil under pressure to the center main bearings

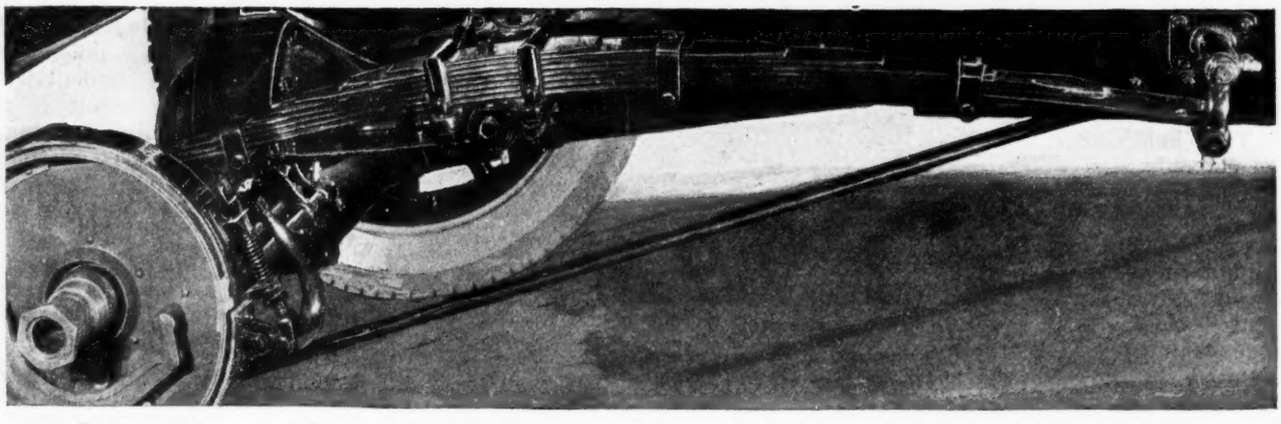
Other bearings throughout the powerplant have also been given attention with a view to increasing their life. The fan bracket bearing has been increased in length and diameter. The hole in the gearcase cover for the fan bracket now has a bronze bushing and holes have been placed in the rocker arm covers so that the rocker arms can be oiled without moving the large cover. These holes are provided with a sliding cover to close them against dust.

A careful study of the valve system has been completed with the idea of making its operation more quiet. In order to eliminate the varying clearance, due to expansion, a combination push rod of aluminum and steel is now being used, so that the valve will have about the same clearance from 0 deg. to 212 deg., Fahr. The lower portion of the push rod is aluminum and the upper portion is steel. The aluminum, on account of its greater coefficient of expansion, is employed to give a more rapid expansion to the push rods so that the expansion of the parts of the motor which tend to lift the rocker arms away from the push rod and to increase the clearance will be equalized by the expansion in the push rod itself. This permits the tappets to be adjusted several thousandths closer than formerly, and thus minimize rod noises. Felt has been placed around the valve stems inside the valve springs to carry oil for the valve stems and guides. This provides enough lubrication to prevent sticking and squeaking valve stems. More positive lubrication is also assured for the front camshaft bearings by providing an oil well at this point.

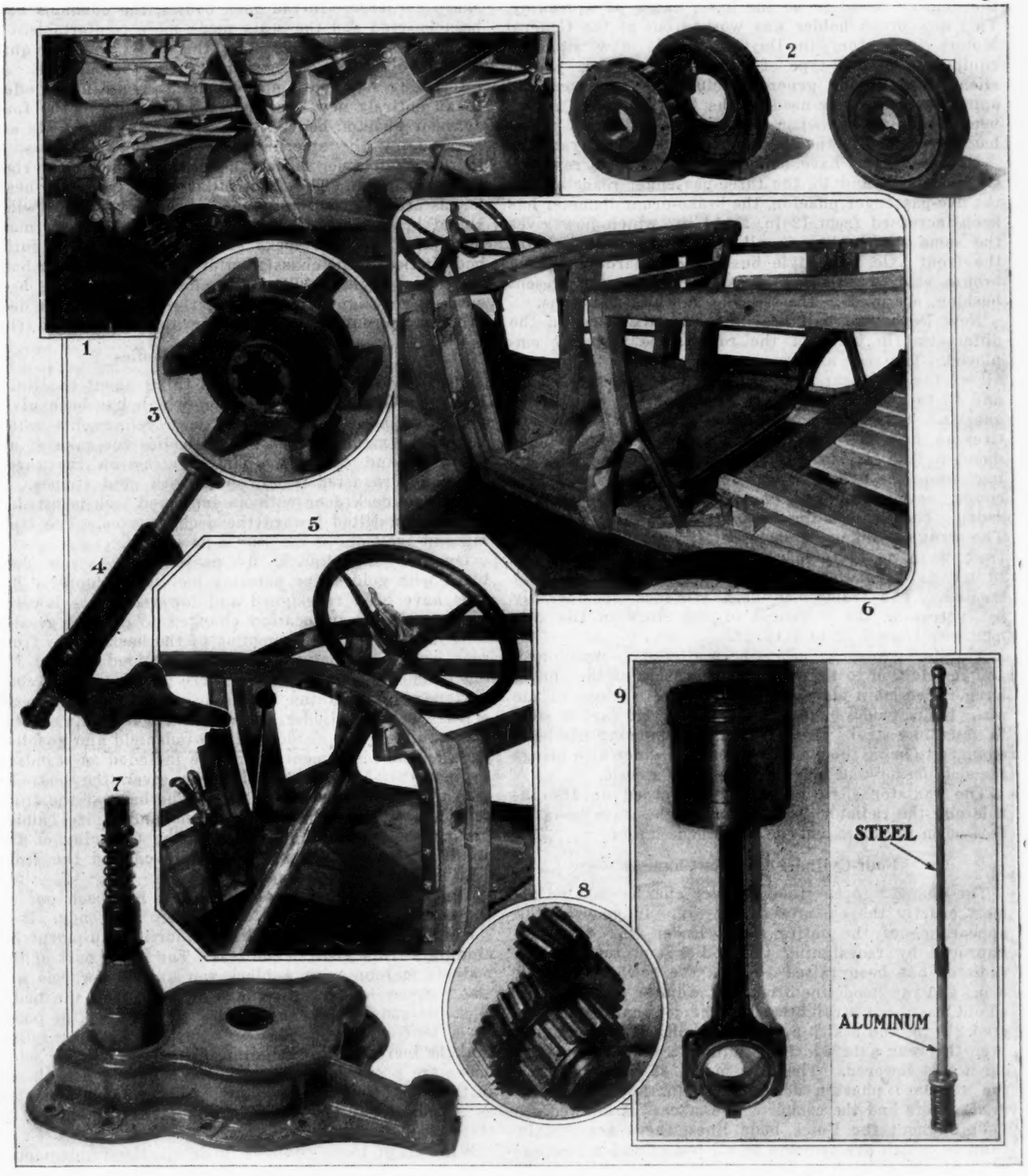
Better construction is also employed for some of the auxiliary units. For instance, the means for driving the fan pulley has been revised so as to eliminate the possibility of the key dropping into the timing gears. New water pump packing which eliminates cutting of the pump shaft has been employed and the pump shaft diameter is now stepped to insure proper assembly of the impeller. The location of the taper pin has also been changed to prevent damage to the water pump body in case the taper pin should back out.

Greater durability has been secured in the clutch by changing some of the material. The clutch hub, for instance, is now drop-forged steel instead of malleable iron. The splines are now case hardened and ground and the clutch plates are fitted to closer limits on the splines and pins. This will decrease wear and obviate rattles.

The electrical equipment has also been refined in many particulars. The motor generator has been redesigned in regard to its electrical characteristics to give it a higher charging rate. The brushes and brush holders have also been altered to eliminate squeak and more accessible oilers are provided for the bearings.



Rearranged rear cantilever spring with long forward end. New position of anchorage is said to prevent side sway



Some of the changes in the new Buicks: 1—Inverted steering gear housing. 2—New silent type of overrunning clutch used on motor generator. 3—Clutch hub is now a steel forging instead of a malleable casting formerly used. 4—Starter switch showing spring used to prevent rattle. 5 and 6—Views of body framing, showing substantial irons used to strengthen the body. 7—New timing gear housing with larger bearing holes. 8—Helical gears employed to insure quieter cranking. 9—Connecting rod and piston with lower ring eliminated. The piston has been lengthened above the piston pin boss. The composite pushrod is intended to enable the use of less clearance at the tappet than was formerly required and thus insure quieter operation

The brush holder is now a die casting with a bronze spring member which has sufficient give to eliminate the chatter found to be the basic cause of squeaking. This new brush holder was worked out at the General Motors Laboratory in Dayton and is now standard equipment on this type of generator. A new type of silent over-running generator clutch is employed and spiral teeth are now used on the starting gears to prevent excessive noise when cranking the engine. A spring has been added to the starter pedal to prevent rattle.

The rear axles have been modified in some respects. On models 44 and 45, the three-passenger roadster and the five-passenger phaeton, the brake-drum diameter has been increased from 12 in. to 14 in., which now gives the same size brakes on all six-cylinder models. On the front axle, new style bushings of hard burnished bronze, said to give three times the life of the present bushing, are used in the steering knuckles and arms.

New Departure ball bearings are now used on the differential in place of the roller type formerly employed. The rear axle gear ratios are now 4.4 to 1 on all of the open cars and on the five-passenger sedan and 4.7 to 1 on the remaining models on the six-cylinder chassis. This is in combination with 32 x 4 in. cord tires on the three-passenger roadster and five-passenger phaeton, 33 x 4½ in. cords on the five-passenger touring sedan, the five-passenger sedan, the four-passenger coupe, seven-passenger phaeton and seven-passenger sedan. The tire size on the sport model is 32 x 4½ in. The strut rod diameter on model 45 has been increased from ⅝ in. to 11/16 in. and on the model 45 from ½ to 9/16 in. These are now of better steel and are heat treated. The frame has been stiffened considerably by increasing the thickness of the stock in the side members from 5/32 to 3/16. in.

The spring suspension has been altered, as mentioned, and in addition to the change in location of the spring hanger, the main plate and all the front springs of the six-cylinder model have been changed from carbon steel to vanadium steel. The steering gear housing has been changed to bring the clamp boss on top, which also brings the slots on top and prevents leakage of grease.

The radiator shell has been reinforced on the inside and the radiator core support angles have been increased in thickness and the bolts made larger.

Four-Cylinder Chassis Changes

The changes in the four-cylinder chassis parallel almost exactly the changes in the six. In general, the appearance of the entire four-cylinder line has been improved by redesigning the bodies and tops. The radiator has been raised 1¼ in., the cowl lengthened 3 in. and the hood line from the radiator to the windshield has been straightened. The top has been lowered 2½ in. and a kick-up has been placed in the frame over the rear axle which permits the rear end of the car to be lowered. The new model 35 car, which is the standard phaeton design, is 5 in. lower than its predecessors and the complete line of cars is lowered.

Throughout the Buick body lines, there are certain changes which are common to all bodies and a few detail changes on each particular body model which apply to that body alone. On all of the six-cylinder models, nickel beading has been put on the cowl at the rear end of the hood not only for the sake of appearance, but also to prevent wear on the cowl. Nickel beading is also used around the radiator cores on all models except the sport. The sun shade design has been revised to give better appearance. It is of solid sheet metal panel with diecast ends and is covered with imitation leather. The back lights in the bodies have been reduced in size and the rear quarter light frames have rounded corners. All of the molding is oval instead of sharp cornered. In the open bodies, the cushions have been lowered and the seats made more comfortable.

In the four-cylinder line, the body changes quite closely follow the changes in the six-cylinder line. An interesting series of improvements amounting in effect to an entirely new design has been made in the four-cylinder phaeton body. Besides lowering the seats and rearranging the steering gear and control levers, as in the six-cylinder model, the body is much more rigid in construction. The front pillar brace irons are heavier, as are also the rear tonneau brace irons. The windshield bracket and top seat rail have also been made heavier. The door locks are stronger and the entire body is tied to the chassis better by using ten body bolts instead of eight. All of the closed bodies have been entirely redesigned for greater rigidity and have been brought thoroughly up-to-date in appearance and trim.

Detail Refinements in Bodies

Probably the most impressive thing about the Buick body line is the great attention which has been given to detail and the number of small refinements which have been made in each of the bodies for sake of appearance and comfort. The painting on the three-passenger roadster is now blue with gold stripes. A flush rear deck door with an improved lock is fitted, a tire carrier tilted toward the deck, is used. The trimming at the sides of the seat is now piped.

On the six-cylinder, five-passenger phaeton deep black with gold stripe painting has been adopted. The tops have been redesigned and lowered, seats lowered and steering gear location changed to provide greater ease in driving. The trimming of the back of the front seat has been changed and a roll added around the top to improve appearance. There is now a large compartment for curtains in the back of the front seat.

On the six-cylinder, seven-passenger car, a rear vision mirror, sun shade on the windshield and gasoline gage on the instrument board are included as standard equipment. More room has been given the body by widening the rear seat one inch. The back of the front seat has been entirely redesigned and a roll added around the top for appearance. The trimming of the auxiliary seats has also been improved and the front seat frame is now trimmed.

The model 41 touring-sedan, which has been put on the six-cylinder chassis, is an entirely new body. It is a five-passenger car with special touring equipment including a trunk rack in the rear. The lower part of the body is maroon with a black top and the wheels are also maroon but several shades lighter than the body. Nickeled guard rails are placed on the rear of the body. As a touring convenience on this model, the gasoline tank is increased to 22 gallons capacity. Extra wide doors are provided and ventilating windows are placed in the doors and side windows. The car has a heater as standard equipment. A trunk is also included as standard equipment.

With all of these changes in detail, the fundamental specifications of the Buick chassis remain the same. The wheelbase of the four remains as it was, 109 in., and the six-cylinder chassis is put out on two wheelbase lengths, 118 in. and 124 in. On the 118 in. wheelbase are the five-passenger touring-sedan, two-passenger roadster, five-passenger phaeton and five-passenger sedan. On the 124 in. wheelbase are the four-passenger coupe, seven-passenger phaeton and seven-passenger sedan, three-passenger sport roadster and four-passenger sport phaeton.

Liberty Builds Business Type Coupe

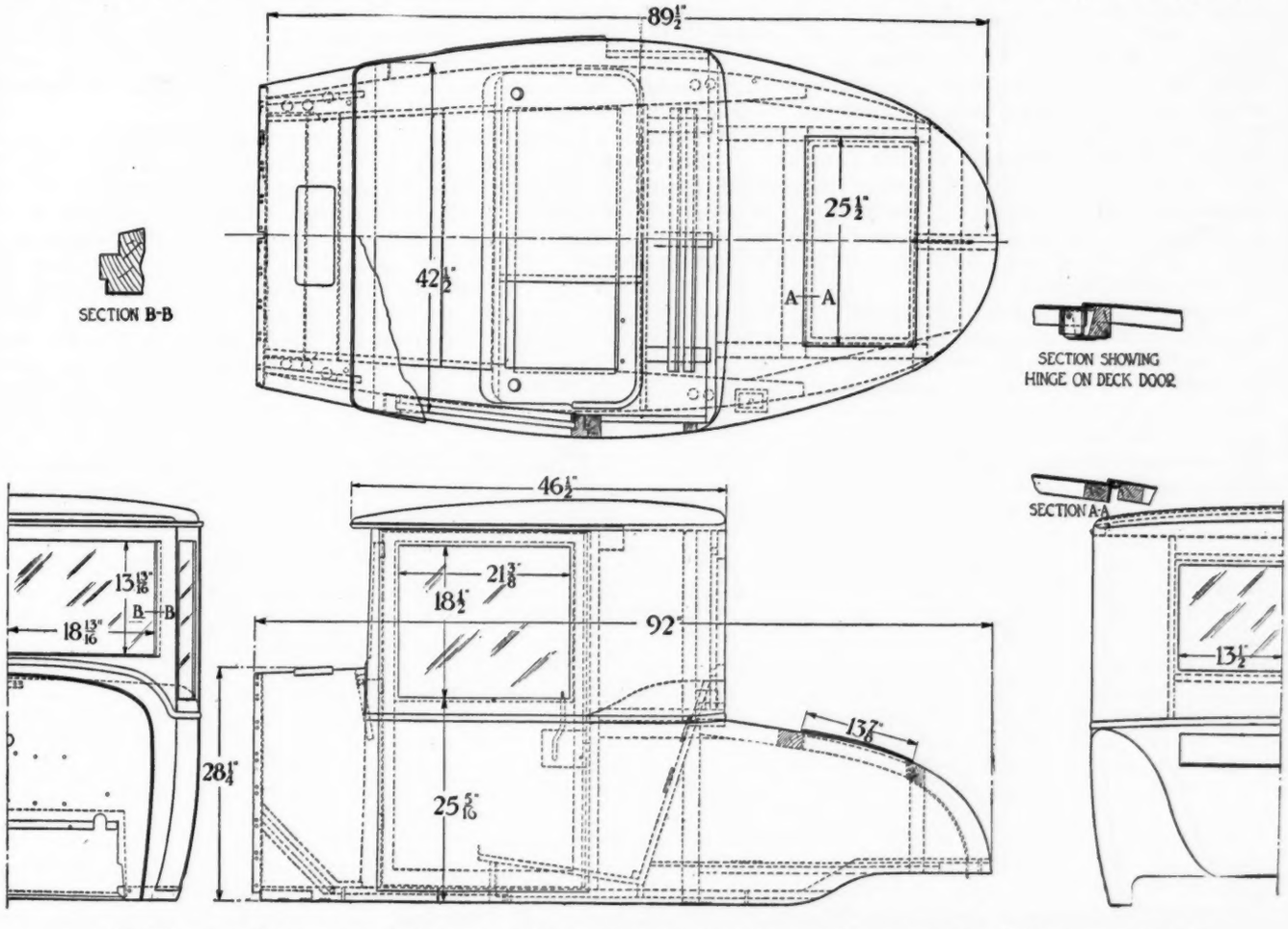
Is arranged for two passengers only. Upper portion of body is steel covered as are also the door pillars. Soft type of top employed. Aluminum steps and fender supports replace running boards. Equipment includes Tuarc wheels, windshield visor, Eagle locks.

A NEW coupe of the type designed particularly for business and professional men, is being manufactured by the Liberty Motor Car Company. The body is a distinctly two-passenger design, the seating arrangement being side by side. The lines of the under part of the body are identical with the Liberty roadster while the upper part is a substantially constructed steel covered unit, which provides exceptional rigidity for this type of body. The method of framing and the major dimension are shown in the cut below.

There are two doors, the width of which is 22 in. and the height 45½ in. The door pillars are of wood covered with steel. One of the features of the body is the large glass rear light. This is bevel glass 13 in. in height by 26 in. in width. It is provided with a silk curtain. The body is fitted with a step instead of a running board and there is an aluminum casting at the base of the rear fender which carries out the step idea and, at the same time, provides a rigid support for the rear fender. The top is a soft type over wood framing and in this as well as in the construction throughout, the design has been arranged so as to eliminate drumming.

The windshield is a one-piece type and the car is provided with a cowl ventilator. Tuarc wheels are standard equipment as are also the nickel trimmed head and parking lights. The car is equipped with a water indicator and special radiator filler cap. The one-piece windshield is provided with a visor.

The doors are fitted with Eagle locks, with an inside lock on the left door and an outside lock on the right door. In addition to the usual dash equipment, there is also a clock and cigar lighter. The price is $1,695.



Details of roadster coupe body put on the market by the Liberty Motor Car Co. This is a straight two-passenger type with steel paneled body and soft top

A Continental Six for $1,000 Cars

Has displacement of only 195.6 cu. in. but develops 50 hp. at 2600 r.p.m. Camshaft and lighting generator are driven by Morse chain in triangular layout. Crankshaft is drilled. Oil fed under pressure to all bearings. Weight without accessories 470 lb.

By J. Edward Schipper

At the time of the Chicago show last February, considerable comment was heard through the trade concerning new cars which classified as $1,000 sixes about to enter the market on a large scale. Three of these cars, Columbia, Davis and Moon, all priced close to $1,000, were shown at that time. All three of them were equipped with a new type of Continental engine known as Model 6-Y, especially designed for this type of vehicle. While the major specifications of this engine were given at that time, this is the first detail description to be published.

The field for which this engine is designed necessarily demands a light weight, economical six-cylinder engine which is designed from the standpoint of low production cost as well as to give performance from moderate dimensions. With a bore and stroke of 3⅛ by 4¼ in., giving 195.6 cu. in. piston displacement, the engine peaks at 2600 r.p.m., at which point it develops slightly over 50 hp., as will be noted from the curves shown herewith prepared by the laboratory of the Continental Motors Corp. The engine develops between 115 and 118 lb.-ft. torque from 400 to 2200 r.p.m. Forty-five hp. is developed at 2160 r.p.m. Experimental cars equipped with this engine have shown a speed range from 3 to over 60 miles per hour on high gear.

The engine is an L-head type with the cylinders cast in a unit with the crankcase. One of the features of the cylinder casting is the layout of the water spaces, which are designed to maintain the proper operating temperature around all points in the combustion chamber. The cooling water surrounds every valve seat and valve stem. The removable cylinder head is attached to the cylinder casting by twenty-one studs. Four lifting lugs are supplied to simplify the removal of the head and to prevent damage to the copper asbestos gasket.

The cast iron pistons are 3⅛ in. long. They are provided with three rings of the one-piece, diagonally split type. The rings are hand fitted, first to the cylinder bore and then to the grooves of the piston. The piston pin is clamped in the connecting rod, the clamp bolt passing through the connecting rod just below the piston pin, which is grooved to fit the bolt. The connecting rods are 8¼ in. long from center to center.

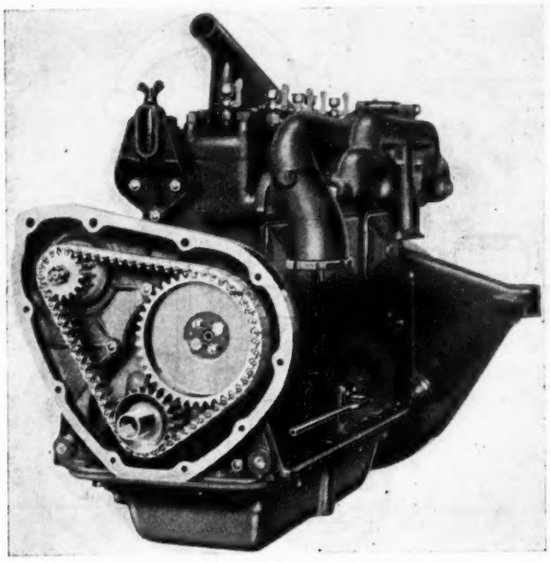
The usual Continental practice in the assembling and fitting of the connecting rods is employed. The work of fitting the connecting rod lower end bearings to the crankshaft is done before the shaft is assembled in the crankcase. The piston pin is fitted in the piston before assembly and then the piston assembly is fitted to the connecting rod. Each of these operations is checked in manufacture on special fixtures to insure alignment. The crankshaft is carried on four bearings, each of which is 2 in. in diameter. The lengths, from front to rear, are respectively, 1 7/16, 1⅜, 1⅜, 2 11/32. The crank bearings are also 2 in. in diameter and 1⅜ in. in length.

The camshaft and lighting generator are driven by a triangular Morse silent chain layout. An eccentric adjustment on the generator provides a take-up for the chain. The valve mechanism is particularly simple, the push rods riding directly on the cams. The push rods are fitted with an adjusting screw and locking device in the usual manner and the valve guides are removable. The guides are 3 9/16 in. long and are reamed to fit the 5/16 in. valve stem. Three cover plates are employed to protect the valve mechanism and retain the oil mist in which it operates. The push rod guides are removable and are made in three groups of four each and arranged in such a manner that they form a sub-assembly which can be removed as a unit without disturbing the cylinder block.

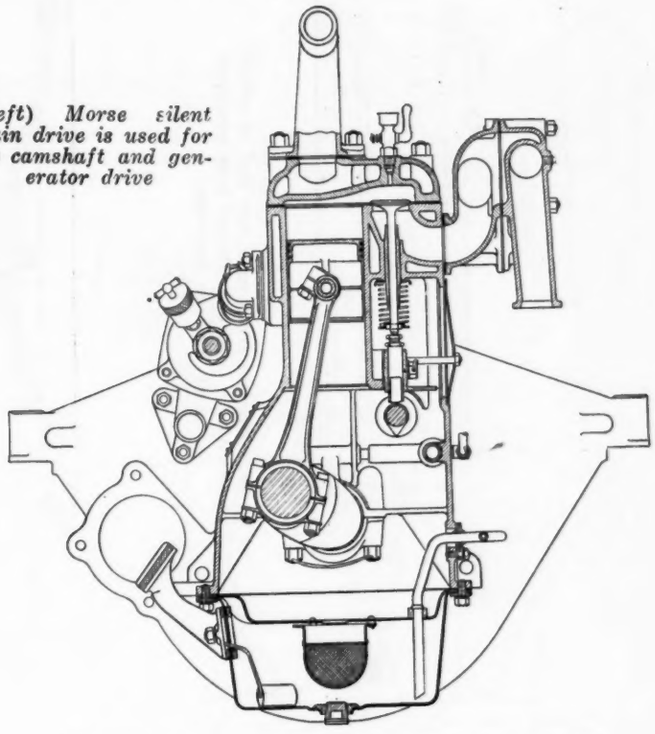
Lubrication is by pressure feed with a gear type oil pump. The pump is located in the chain case. The oil is drawn through a copper tube leading from the oil reservoir to the pump, from which it is forced to the main distributing line which has branches running to each of the four main bearings. The oil enters the drilled crankshaft at these points and is distributed under pressure to the connecting rod bearings. Other points are lubricated by the oil which is thrown from the connecting rod lower end bearing. As an added protection to each of the four camshaft bearings, a catch basin from which oil flows through drilled ducts is provided.

Cooling is by centrifugal water pump bolted to the flywheel housing and driven by an extension shaft from the electric generator. The inlet system is arranged to provide an adequate amount of heat to assist in the vaporization of present-day gasoline. The intake and exhaust manifolds are separate castings, but are so arranged that the heat of the exhaust is utilized to assist in vaporizing the fuel.

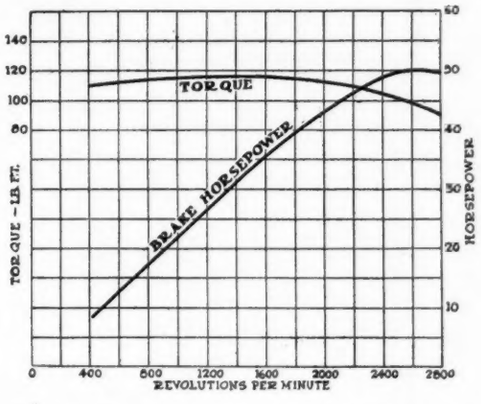
The engine is designed to be installed with a three-point suspension. The third point of support measures 1½ in. by 1⅝ in. and is integral with the chain case cover. The rear supporting arms are cast integrally with the flywheel housing. This housing is a separate unit which bolts to the crankcase. The crankcase is machined to accommodate a gearset with a No. 4 S. A. E. bolting flange. Provision is made for carrying an electric starting motor by means of a No. 1 S. A. E. flange mounting. Teeth are cut directly into the rim of the semi-steel flywheel to mesh with the starting motor pinion. The weight of this engine, without accessories, is given as 470 lb.



(Left) Morse silent chain drive is used for the camshaft and generator drive

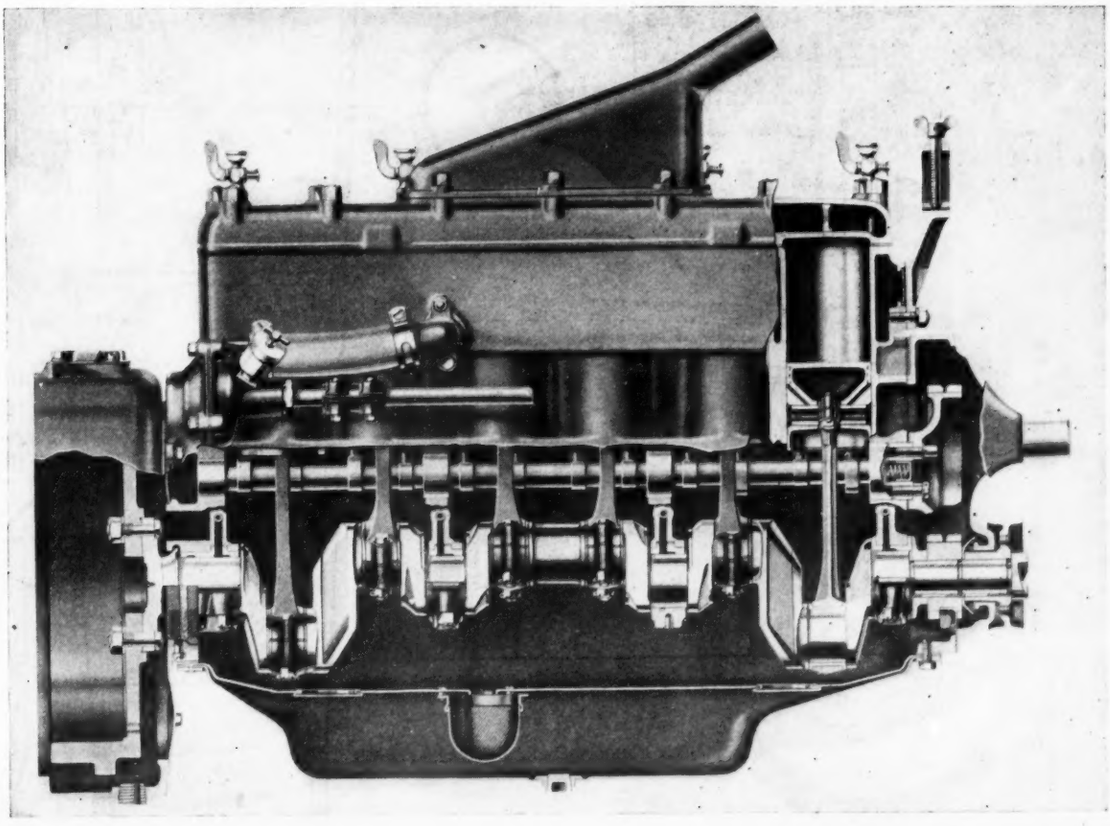


(Above) Transverse section of the engine, showing shape of combustion chamber and the manifold arrangement

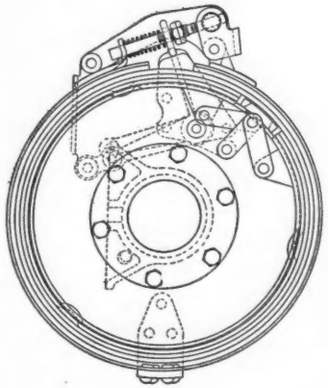


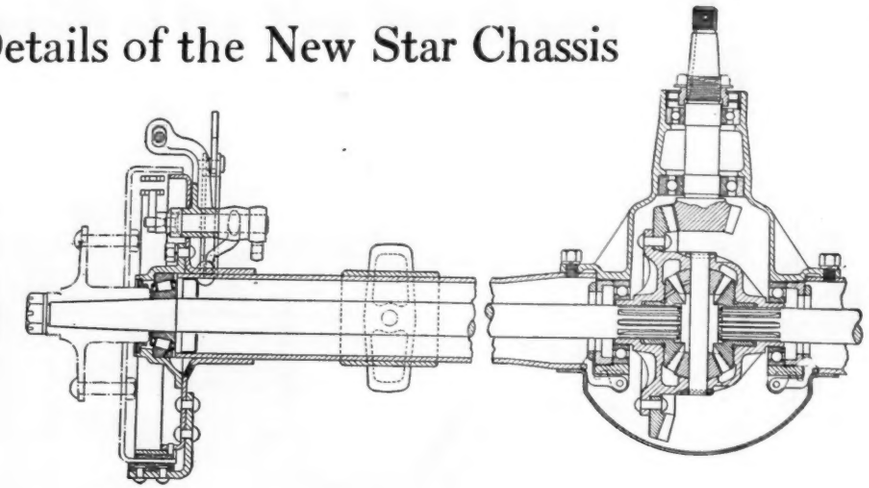
(Left) Horsepower and torque curve of Continental 6-Y engine, 3⅛ in. stroke, 4¼ in. bore, 195.6 cu. in. piston displacement

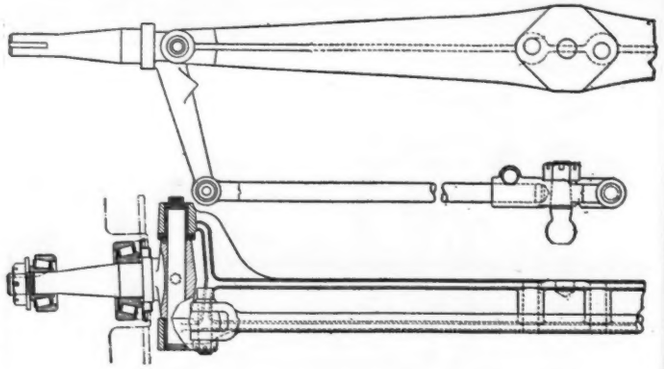
(Below) Part sectional view through Continental 6-Y engine designed for use in $1,000 six-cylinder type of car



Engineering Details of the New Star Chassis

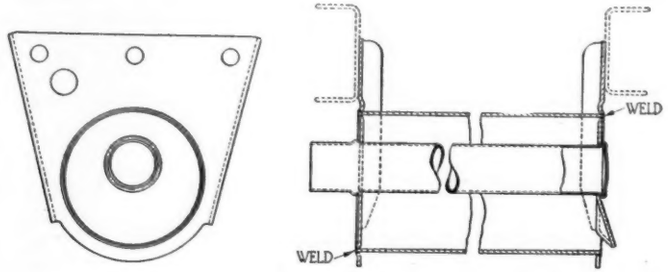


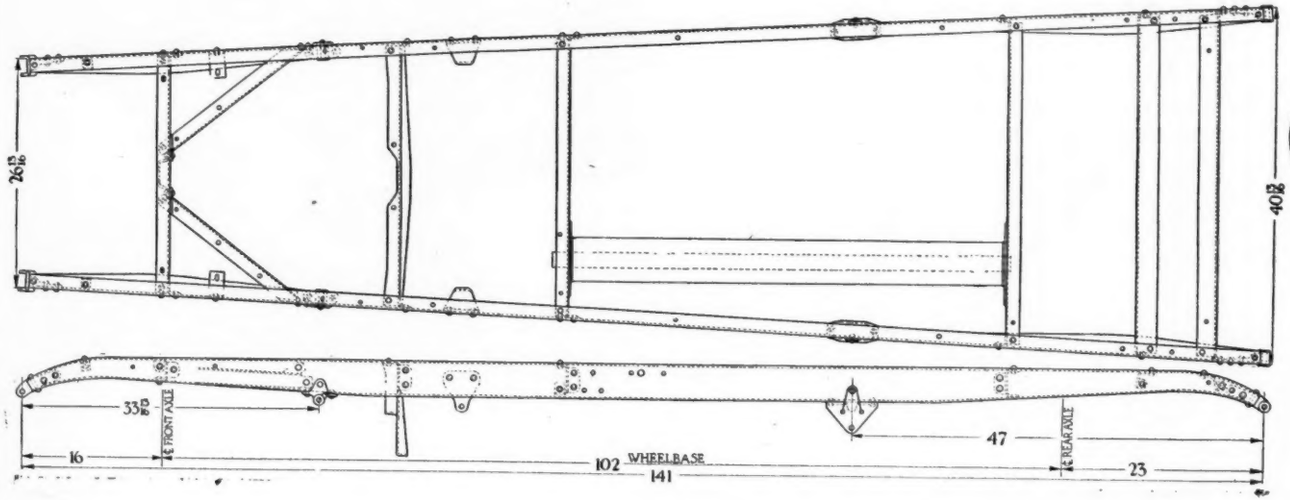


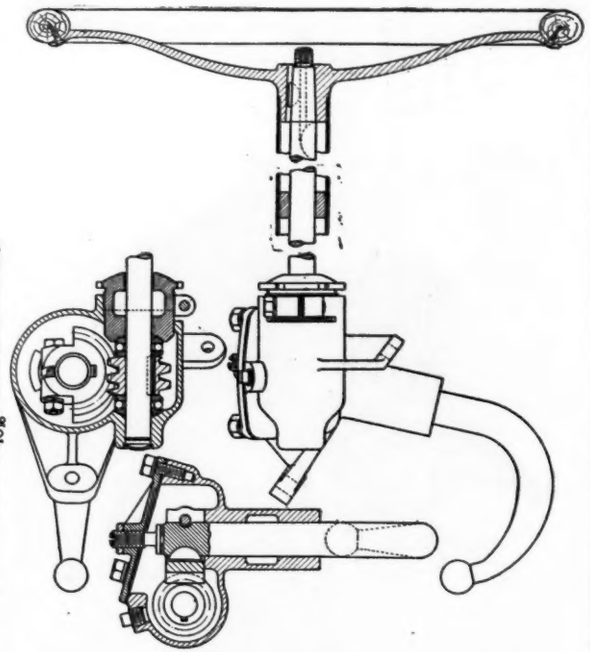


The Star-Timken front axle, one end of which is shown above, is a conventional type equipped with Timken bearings

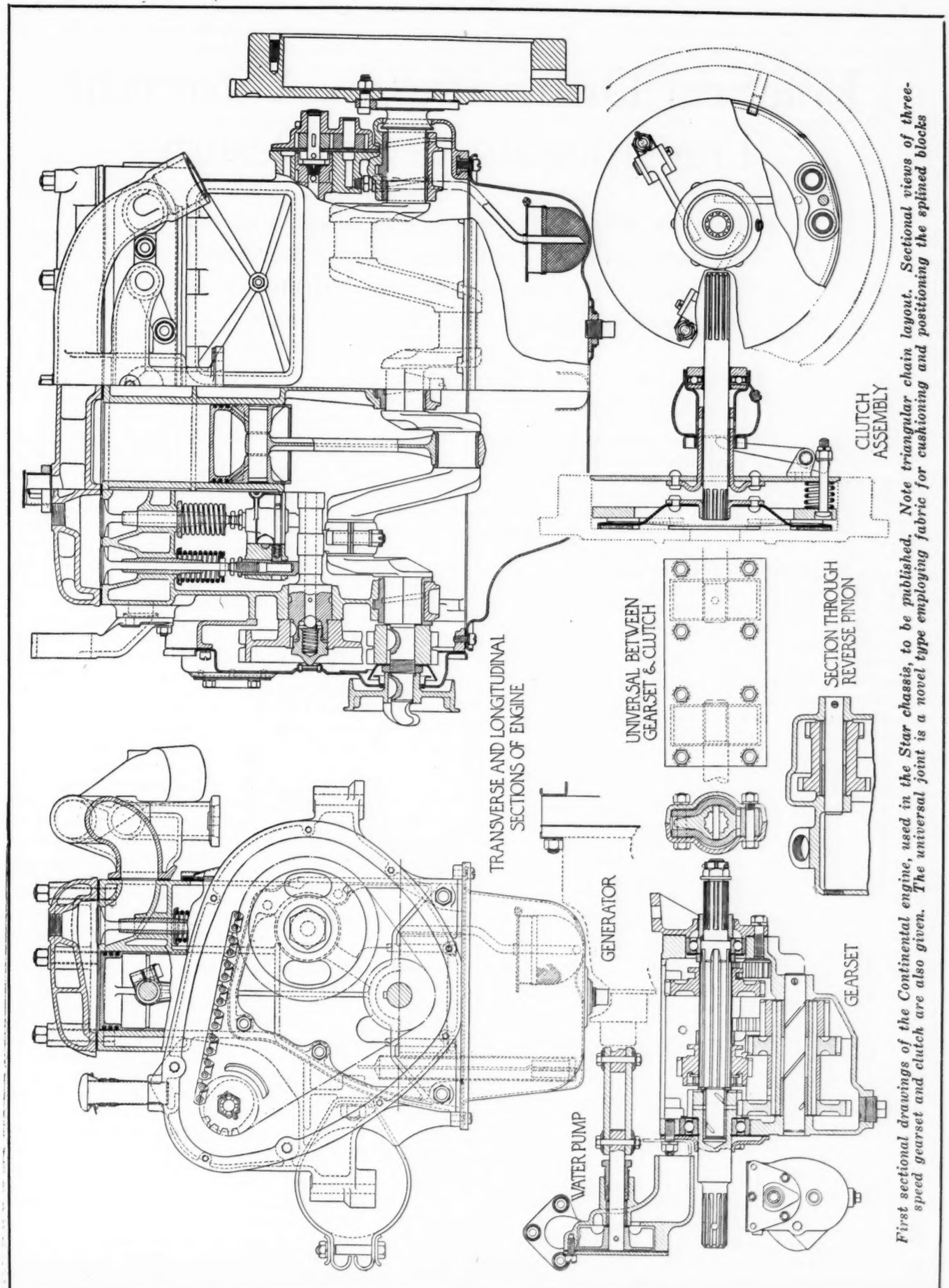
Above—Sectional view of Timken semi-floating rear axle to be used in Star car. At right—Detail of muffler which is also designed to give the frame, shown below, an unusual degree of torsional strength. Note diagonal bracing of frame







Star worm and worm wheel sector type steering gear



First sectional drawings of the Continental engine, used in the Star chassis, to be published. Note triangular chain layout. Sectional views of three-speed gearset and clutch are also given. The universal joint is a novel type employing fabric for cushioning and positioning the splined blocks

Practical Difficulties in Automatic Transmission Gear Design

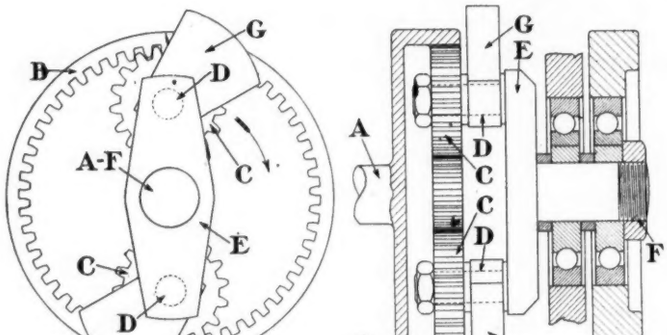
Andreau gear the latest device to produce an automatic, continuously variable gear. An internal type planetary gear with operation controlled by a pair of centrifugal weights. A gearset substitute must be capable of increasing engine torque.

By P. M. Heldt

SINCE the days of the early belt-and-stepped-pulley drive automobile, many attempts have been made to produce a transmission which, though positive in action, would permit of varying the gear ratio by imperceptible gradations, and some of the inventors have even tried to incorporate an automatic feature in the gear, so that as the traction resistance increased the available rear axle torque would increase correspondingly.

Such an automatic, continuously variable gear would certainly be a great boon to the motor industry, provided it was efficient and reliable and could be produced at moderate cost. Up to the present all of these attempts have failed of commercial success, but inventors naturally are a persevering class, and in spite of a record of numerous failures they have not despaired of solving the problem.

One of the latest devices of this type proposed, known as the Andreau gear, has been described in British publications. It consists essentially of an internal type of planetary gear whose operation is controlled by a pair of centrifugal weights instead of by a friction band.



End view and cross section of Andreau automatic variable gear

An end view and a cross section of the device in diagram are shown herewith. A regular friction clutch is used in connection with this gear, but is not shown in the drawing. The driving shaft from the clutch, shown at A, carries an internally toothed drum B. The driven shaft to the rear axle is shown at F, and carries a cross-plate or spider, E, which is provided at each end with crosspins D, on each side of which are carried gearwheels C, and weights G, which are free to revolve on these pins but are solid with one another.

The operation of the gear is as follows: With the car, and, therefore, the shaft F stationary, the clutch is engaged and the gear drum B then revolves with the engine, with the result that the pinions C revolve in their own pins, each with its attached weight. This gives the lowest possible gear ratio between the gears, sufficiently low to start the car, it is claimed.

As soon as the car starts, the spider E revolves and in revolving causes the weights G to tend to fly outwards and remain there. Therefore, as the speed of the car and that of the shaft F increases, the centrifugal action of the weights gradually gains an ascendency over the effort of the pinions C to revolve them, until a point is reached when the centrifugal action due to the high speed of the shaft F and spider E is sufficient to hold the pinions C stationary on their spindles, at which stage the two shafts A and F are revolving at the same speed, thus amounting to a direct drive, the power passing from the gear drum B to the stationary pinions C merely by the interlocking of their teeth.

Reading the above description in a British contemporary, the writer became interested on account of the simplicity of the device and the claims made for it. It seemed too good to be true that it was possible to get a continuous variation in speed from one extreme to the other and to be able to do so automatically without necessity for touching the clutch pedal or shifting gears, and he therefore set out to find out what was wrong with the gear.

The first thing which looks somewhat questionable is that with the driven shaft stationary, the planetary pinions with their weights revolving the device should be capable of giving the torque necessary for starting the car. An inspection of the diagram makes it hard to see how any torque is obtained under this condition except the small amount due to the friction of the planetary pinions on their studs. This friction, of course, results in a certain pressure between the teeth of the pinions and the ring gear, and the reaction to this pressure or force appears in the form of a pressure of the pinions on their studs normal to the plane of tooth contact. One would expect the bearing and tooth friction of the gears to be very low and the available torque, therefore, to be very small. However, there is one other factor to be considered and that is the inertia of the revolving weights. If the clutch is let in suddenly, the gear ring will speed up very rapidly and as

with a stationary driven shaft the planetary pinions with their revolving weights would have to gain speed about three times as fast, it is evident that the inertia of the weights causes a heavy drag or resistance to the speeding up of the planetary pinions, which in turn may result in insufficient torque on the driven shaft to start the car, especially on a grade.

However, the torque which can be exerted on the driven shaft is in no case greater than the motor torque, and this is the real weakness of the device. With the same torque on the driven as on the driving shaft, if the speed is reduced, say in the ratio of 4:1, the efficiency of transmission is only 25 per cent. The loss of 75 per cent goes partly to overcoming bearing and tooth friction but mainly to increasing the kinetic energy of the revolving centrifugal weight. Therefore, such large reductions can be obtained only momentarily, unless the device is purposely built with high friction in the pinion bearings, in which case we approach the so-called slip device—an ordinary friction clutch or a magnetic or hydraulic drag device which is allowed to slip sufficiently to give the desired speed reduction. However, the chief object of the gearset on an automobile is to permit of multiplying the engine torque, for accelerating and hill climbing, and any device which is incapable of increasing the engine torque is entirely unsuitable as a substitute.

German Motor Vehicle Taxes Have Been Revised

OWING to the depreciation of the mark the German Government has recently revised its motor vehicle registration fee or tax law which had been in force since 1906. One objection to the old registration fees was that they varied in classes, so that designers often chose certain engine dimensions in order to bring the car just within a certain tax class, without regard to technical and other economic requirements.

According to the new law, bicycles with auxiliary engines, motor scooters, etc., are tax-free. Other motorcycles with engines of up to 1.5 hp. pay 100 marks per year; over 1.5 and up to 3 hp., 150 marks; over 3 and up to 3.5 hp., 200 marks; over 3.5 and up to 4 hp., 275 marks; over 4 hp., 350 marks.

The tax on passenger cars is to be calculated as follows under the new law: For each of the first six rated horse power or fraction thereof, 100 marks; for each of the next 4 hp., 200 marks; for each of the following four rated hp., 300 marks; for each additional hp., 400 marks. The formula for determining horse power remains the same.

Taxes on motor trucks and omnibuses under the new law are not based on the horse power rating, because this would have encouraged the use of high speed engines, which is thought undesirable for commercial vehicles, and would have discouraged the use of so-called over-dimensioned engines which are coming into use because of their higher fuel economy. The tax is based on the weight of the empty vehicle ready for the road and is determined from the following table:

Annual Tax for Gasoline Trucks

Weight of Vehicle Empty, in Kg.	Tax in Marks
Up to 500	300
Over 500 up to 1000	600
Over 1000 up to 1500	900
Over 1500 up to 2000	1,200
Over 2000 up to 2500	1,400
Over 2500 up to 3000	1,600
Over 3000 up to 3500	1,800
Over 3500 up to 4000	1,900
Over 4000	2,000

Electric trucks of a certain weight usually carry only about one-half the useful load as gasoline trucks of the same weight, and therefore the former are accorded a lower tax rate than the latter. Road tractors with internal combustion engines and steam trucks pay the same tax as electric trucks, which is determined from the table.

Motor trucks using the public highways in Germany are limited to a maximum total weight, loaded, of 9000 kg. and the largest vehicles in use have a load capacity of 5000 kg. and weigh about 4000 lb. empty.

Registrations for shorter periods than one year are accepted, down to 2 months. The tax for a half year is two-thirds that for the full year, and for two months, one-quarter that for the full year. A certain amount of the income from the motor vehicle tax will be distributed by the Federal Government among the Governments of individual states, to be used for road maintenance. The provision in the former law for the issuance of temporary licenses to non-residents at very low rates has been withdrawn. It is expected that the new tax will yield 125,000,000 marks, but the cost of collection will probably not be much less, as many new officials will be required.

Annual Tax for Electric and Steam Trucks and Gasoline Tractors

Weight of Vehicle Empty, in Kg.	Tax in Marks
Over 500 up to 1000	300
Over 1000 up to 1500	450
Over 1500 up to 2000	600
Over 2000 up to 2500	700
Over 2500 up to 3000	800
Over 3000 up to 3500	900
Over 3500 up to 4000	950
Over 4000	1,000

In addition to the registration tax referred to above there are two other taxes on motor vehicles in Germany, the sales tax of 2½ per cent applying to all merchandise and the luxury tax of 15 per cent.

In recent years local taxes have been levied on motor vehicles in many places, but with the coming into force of the new law these taxes are rescinded. Cars of physicians with a tax rating of less than 8 hp. in towns of less than 20,000 inhabitants are exempt from taxation, as are vehicles used exclusively for the transportation of tools and utensils or for operating machinery.

EVERY motor vehicle in Poland confronts the problem of securing suitable gasoline and oil. The crude petroleum found in Poland is of very low gasoline content, about 6 per cent, compared with 12 and 15 per cent in the United States. In addition, the gasoline produced locally is of very poor quality, sometimes having a specific gravity as low as 590. The oil also is usually of poor quality and heavy grade unsuitable for use in smaller engines.

Notwithstanding its poor quality as fuel, gasoline sells for 550 marks per gallon (about 35 cents) and is difficult to obtain even at that price. This fact coupled with poor service facilities, has been an important factor in keeping the use of motor cars at a low point: it is estimated that there are not more than 6000 gasoline motor vehicles in Poland to-day.

How to Build Battery Ignition Condensers Commercially

Destructive arcing at contact points eliminated. Most important condenser duty is to bring about high induced secondary voltage. Condenser action in hurrying collapse of magnetic field described.

By R. E. Marbury*

THE function of a static condenser in an ignition set is often misunderstood, and its effect cannot easily be studied except by means of oscillographs or similar laboratory devices. However, it performs a very important duty, and the long life of contacts and general operation of the engine is very dependent on the condenser.

Considering Fig. 1, voltage is induced in the high voltage or secondary coil and hence across the spark plugs by the collapse or subsiding of a magnetic field in the iron core X around which the low voltage and the high voltage coils are wound. The magnitude of this secondary voltage or its ability to produce a "fat" and "hot" spark depends on how fast this magnetic field collapses. This effect is assisted by the action of the condenser, shown at C. in Fig. 1, which is connected across or in parallel with the interrupter points P. So connected, its function is to reduce the arc formed when the interrupter is opened by the cam, which results in two beneficial effects. The first of these prevents the burning of the points themselves, and the second hastens the collapse of the magnetic field which, as stated above, improves the quality of the ignition itself.

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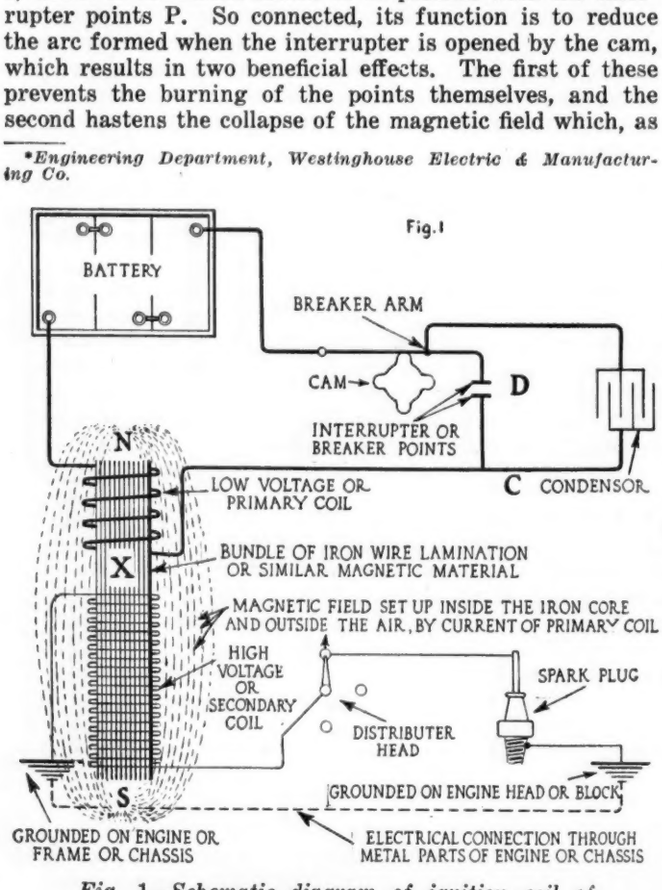


Fig. 1
BATTERY
BREAKER ARM
CAM
D
INTERRUPTER OR BREAKER POINTS
N
LOW VOLTAGE OR PRIMARY COIL
C CONDENSOR
X
BUNDLE OF IRON WIRE LAMINATION OR SIMILAR MAGNETIC MATERIAL
MAGNETIC FIELD SET UP INSIDE THE IRON CORE AND OUTSIDE THE AIR, BY CURRENT OF PRIMARY COIL
HIGH VOLTAGE OR SECONDARY COIL
SPARK PLUG
DISTRIBUTER HEAD
S
GROUNDED ON ENGINE HEAD OR BLOCK
GROUNDED ON ENGINE OR FRAME OR CHASSIS
ELECTRICAL CONNECTION THROUGH METAL PARTS OF ENGINE OR CHASSIS

Fig. 1—Schematic diagram of ignition coil of usual standard construction

Assuming for the moment that the condenser is omitted from Fig. 1, and that the interrupter points are closed, let us consider briefly the cycle of operations in the ignition system. A current then flows from the battery through the low voltage coil and sets up a magnetic field in the iron core, making a north pole at one end and a south pole at the other, as shown. The next instant the cam moves and opens the interrupter circuit through the low voltage coil and the battery current ceases. When the battery current stops, the magnetic field dies down, and since it is interlinked with the high voltage coil, it sets up a voltage in that coil by an effect known as induction. Since there are many more turns of wire on the high voltage coil than on the primary, the original six volts from the battery is magnified up to several thousand until it is enough to jump across the spark plug. The faster the battery current in the low voltage coil and the magnetic field die down, the higher will be the voltage produced or "induced" in the secondary coil.

THE action of the condenser in hurrying the collapse of the magnetic field is this: When the interrupter contacts first begin to open and have attained a very small spacing, the voltage per unit of space is beyond the insulating or dielectric strength of the air, and an arc is established. This arc is maintained because the voltage is built up by the inductive action of the primary faster than the spacing is increased, but it finally goes out when the inductance voltage falls below the voltage required to maintain ionization. Ionization is the charging of minute particles of air in such a manner that they form a conducting path for the current through the air.

The rate of decrease in primary current and consequent collapse in field are reduced by the arcing at the contacts, because if no arc existed and the primary current could change from a definite value to zero instantly, this would give the fastest collapse in the field and the maximum secondary voltage.

Because of the arc, this instantaneous reduction cannot be obtained even with very high speed mechanical opening, and the condenser is used and its charging characteristic is made use of to accomplish this purpose.

When a completely discharged condenser is connected across a d.c. voltage, the current rises momentarily to a maximum value limited only by the resistance of the leads and the foil in the condenser, and as the condenser becomes charged, the charging current falls along a very steep curve approaching zero when the condenser is completely charged. The length of time required for this

current to fall from a maximum value to zero with a constant voltage applied depends upon the size of the condenser and the resistance through which it is being charged. This time is very short in any event, being on the order of one thousandth of a second or even less.

Therefore, if this condenser is connected in parallel with the contacts of a breaker or interrupter, when the contacts open, the current in the condenser lead starts at zero and increases very quickly to the normal current that was passing through the contacts. It then drops on a very sharp curve toward zero again as the condenser becomes charged. By the time the condenser becomes partially charged and the current begins to drop on this sharp curve, the contacts have already attained a definite separation and the condenser serves the purpose of bringing about a steep depreciation in primary current giving a high induced secondary voltage by the rapid collapse of the primary field.

CONTINUED oscillatory currents (see below) follow with most ignition sets, which have the effect of increasing the duration of the secondary spark.

The condenser action just described can be shown graphically by a reference to Figs. 2, 3, and 4. In Fig. 2 the interrupter contacts are closed and a current flows from the battery through the primary coil in the direction shown by the arrows. In Fig. 3 the contacts have started to open and there is a charging current flowing into the condenser. This may be thought of as similar to compressing a spring mechanically. An instant later the "spring" rebounds as shown in Fig. 4. That is to say, the condenser has become charged and immediately discharges itself, causing the current to flow in the direction shown by the arrows or opposite to the normal direction due to battery voltage. This "rebound" results in killing the current in the primary coil very much more rapidly than it would die down if there were no condenser, and thus increases the voltage in the secondary available to "shoot" the spark plugs. After this "rebound" has spent itself, the battery again charges the condenser in the other direction and the cycle is repeated, but it does not attain quite the same intensity the second time. It is this reversal of current between battery and condenser that is referred to as "oscillatory currents" above, and as each reversal changes the magnetic field in the iron core, this action prolongs the duration of the secondary spark, which is of advantage in firing slow burning mixtures.

If the condenser were of too large capacity, it would be similar to the action of too large a spring which would absorb the energy instead of "bouncing it off" as just described. This means there would be no reversal of current and hence no help in increasing the secondary voltage. Also, when the contacts touched again this energy would be released at the instant of contact, producing burning and incipient welding. This is saying, in another way, that too much capacity in the condenser is as bad as too little, and the correct balance between the two for a given set of conditions is one of the nice problems of the ignition engineer.

In order that a condenser may function properly in this service, it is obvious that its inductance and metallic resistance should be kept small, and its dielectric or breakdown voltage sufficiently high to withstand the inductive voltage kicks that may be impressed upon it at the completion of its charge.

The capacity of the condenser in micro-farads depends on the form of primary coil, its inductance, and the amount of current broken.

If the capacity is too large, as stated above, its discharge at the reclosing of the contacts may have a destructive effect similar to percussive welding, and if the condenser

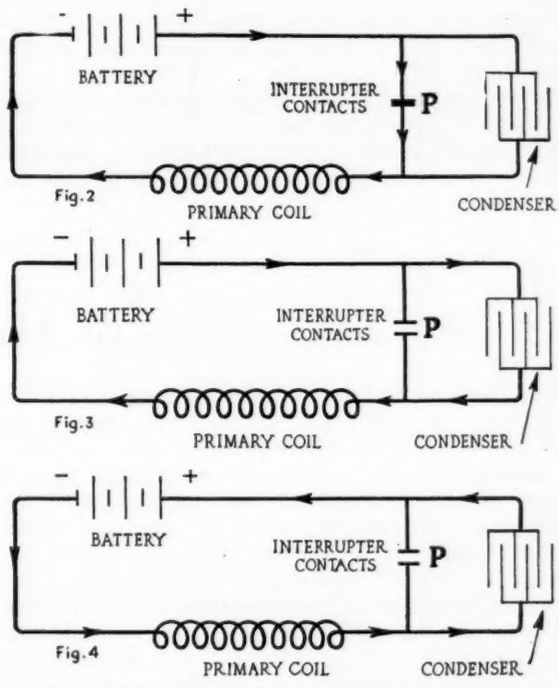


Fig. 2—Interrupter contacts closed. No action in condenser. Fig. 3—Interrupter contacts opening and condenser charging. Fig. 4—Interrupter contacts still open and condenser discharging. Note reversal of direction of current through primary coil

is very small, its resistance and inductance will predominate and it will not perform properly unless theoretically perfect.

A condenser consists fundamentally of metal conductors having insulation interposed. The capacity varies directly with a certain quality of the insulating material and the projected area of the plates, and inversely with the square of the insulation thickness. The constants of the materials are measured relative to air, which has a constant of unity value, and most waxes run between 2½ and 4, while mica and glass run as high as 6 and 9 respectively.

IGNITION condensers have been made commercially with paper impregnated with various waxes and with thin sheets of mica. Some manufacturers find it more economical to use mica, while others use impregnated paper. This is largely a matter of cost and manufacturing methods, there being very little to be gained by the use of mica except where service is very hard and where the condenser is subjected to extremely high temperatures and voltage. The impregnated paper condenser lends itself to an infinite variety of shapes, such as flat, round, curved, etc., and is more generally used.

Much difficulty is experienced in the manufacture of mica condensers with thin sheets due to metallic veins, and successful manufacture of wax condensers depends on the degree of impregnation and standards of material. Condensers when heated often expand, with consequent change in capacity. This is guarded against by enclosing them in moulded cases or tightly assembled tin boxes.

Condensers generally fail in but one way, namely, puncture or breakdown. However, a poorly assembled condenser might expand when heated and fall off in capacity due to increased dimension between plates, or it may become open-circuited.

When the condenser punctures, the ignition unit is inoperative, and this condition may be checked by disconnecting one lead of the condenser and observing the nature of

the spark. The engine will generally run but very unsatisfactorily, with excessive sparking at the contacts, and continued operation without the condenser will soon destroy the points.

Should the condenser become open-circuited, the engine would, of course, behave the same as above, but a decrease in capacity would result in poor performance, depending upon the degree of change, and can only be determined by one familiar with the ignition outfit in question.

As outlined above, the most important electrical duty of the condenser is to bring about a high induced secondary voltage by its charging characteristics, but incidentally this reduces the amount of sparking at the contacts and consequently increases their life.

Tests of Aluminum Solders

ONE of the handicaps to the more extensive use of aluminum in the industries is the difficulty with which it can be soldered. This is due to the fact that a freshly cleaned surface of aluminum in contact with the atmosphere oxidizes immediately, and no flux seems to be known which will dissolve this oxide and at the same time protect the metallic surface beneath it.

A series of tests on soldered joints have been made recently at McCook Field, Dayton, Ohio, and the results are published in Air Service Information Circular No. 298. Fifteen solders were tested, of which fourteen were alloyed by the metallurgical branch of the Air Service and the remaining one was the commercial preparation known as Allen's soldering flux. Compositions of all fifteen alloys are given in the table below. The only composition which was actually determined chemically was that of No. 15, Allen's soldering flux, the other compositions being known from the proportions of the metals alloyed.

Solder No.	Sn.	Zn.	Al.	Cu.	Mg.	Pb.	Fe.
1....	60.00	40.0	.....	.....	.....	.....	.....
2....	58.20	38.8	3	.....	.....	.....	.....
3....	57.00	38.0	5	.....	.....	.....	.....
4....	54.00	36.0	10	.....	.....	.....	.....
5....	57.40	38.6	3	1	.....	.....	.....
6....	56.40	37.6	3	3	.....	.....	.....
7....	56.40	37.6	5	1	.....	.....	.....
8....	55.20	36.8	5	3	.....	.....	.....
9....	52.40	36.6	10	1	.....	.....	.....
10....	52.20	34.8	10	3	.....	.....	.....
11....	59.40	39.6	.....	1	.....	.....	.....
12....	58.20	38.8	.....	3	.....	.....	.....
13....	59.10	39.4	.....	1	0.5	.....	.....
14....	57.90	38.6	.....	3	.5	.....	.....
15....	47.86	52.2	Trace.	Nil.	Nil.	Nil.	Trace.

Soldering was done by means of a small oxy-acetylene torch, the flame being kept neutral as nearly as possible. Specimens for soldering were prepared from aluminum sheet ⅛ in. thick, a central member 4 5/16 by 1⅛ in. being soldered to two outer members or lap caps 1 in. square. The soldering was accomplished in the following manner:

A spot ½ in. deep on the ends of the central member and on each of the caps was tinned with the same solder as was used for the joint. The solder was rubbed in with the end of a hack saw blade. On each of the superficially coated ends of the central member a small lump of solder was melted. The lap caps were then successively soldered on by placing them on top of the layer of solder on the ends of the control member and by applying the heat to the uncoated top of the caps. A slight pressure was maintained on the caps while the solder was melted down. The projecting ends of the caps were supported to keep the caps horizontal. The assembled specimens were then turned over so that they were supported by the caps. Heat was then reapplied to level the specimens and to finish up the joints. Sufficient time was allowed after finishing one end of the specimen so that the joint there would not become hot enough to melt when the other end was being bonded.

The excess solder was filed off, and the edges of support and load in shear were filed parallel. The ends of each assembled specimen were cut off and comprised the specimens for actual shear testing. These shear specimens thus consisted of two lapped pieces of aluminum sheet, each 1 in. long, and possessed a soldered area 1 in. wide by approximately 4 in. deep.

The following conclusions are drawn from the results:

Additions of aluminum to solders of tin-zinc base tend to increase the strength of the joint as immediately tested and after aging. The strongest solder of the group is the 10 per cent alloy, but it is of high melting point and sluggish in flow.

THE effect of additions of copper to the aluminum-tin-zinc-alloys is appreciable only in the 3 per cent copper alloys. The best solder of the group from the standpoint of both strength and fusibility is the 3 per cent copper and 3 per cent aluminum alloy.

The addition of 3 per cent of copper to the tin-zinc base produces the more favorable solder in this ternary group. It is as good as the solder containing 3 per cent copper and 3 per cent aluminum and is much superior to the 3 per cent aluminum alloy. The fusibility of this alloy is quite good and its strength is higher than the run of commercial preparations.

Magnesium additions to cupriferous solders produce negative results.

Aged soldering joints tend in general to be of lower strength than joints tested immediately after soldering.

It is probable that cupriferous solders are higher in strength after aging than those of the same approximate analysis which do not contain copper.

THE increasing cost of railway traction in France has opened up a serious problem for the local lines, on which it is impossible to make up for the growing deficit by any further augmentation of rates, and the companies have, therefore, no alternative but to reduce the number of trains, with the result that the public is put to considerable inconvenience. The only solution for the moment appears to be the running of motor rail cars, with one or two trailing vehicles. The trials that have been carried out for some months past near Mantes, with motor rail cars, have proved so far satisfactory that the Minister of Public Works has circularized the prefects in all the departments, suggesting that they should go into the question of replacing steam locomotives with motor rail cars on the local lines. The experiments on the Ouest-Etat railways, with cars propelled by 60-hp. engines, show that the running costs per kilometer are reduced by one-half. The motor rail car weighs 14 tons in running order, and it will draw two trailers of 10 tons each.

Accelerated Aging Tests for Rubber Goods

Method developed by Goodyear engineer is described and results outlined. Samples are heated in air at a temperature of 160 deg. Fahr. Test is useful only in comparing compounds of same general type. Rapid deterioration usually due to over or under cure.

A METHOD for determining the probable life of rubber goods within a period of a few days was described in a paper presented before the American Society for Testing Materials at Atlantic City by W. W. Evans, development manager of the B. F. Goodrich Co. Work, looking toward the development of such a method, was started in the laboratories of the B. F. Goodrich Co. in 1907 by Dr. W. C. Geer. After carrying on numerous experiments at different temperatures and after varying the periods of time, Geer found that 160 deg. Fahr. gave the most satisfactory results. Upon the basis of this work, the following procedure has been adopted and used in carrying out several thousands of such tests.

How Tests Are Conducted

Into an oven heated air was blown at a temperature of 160 deg. Fahr., care being taken to see that a continuous supply of hot fresh air was added during the entire aging period. A number of samples, 3/32 in. in thickness, were previously cut in the form of the standard test strip and placed in this air bath. The test strips were suspended by punching a hole in the enlarged end, passing a wire through and separating adjacent strips by a rubber disk which is of about the same thickness as the test pieces. This separator allows free circulation of air, so that the entire surface of the test pieces is exposed.

The air was then started circulating and the test continued for a period of two weeks, taking out three samples each day. These were allowed to stand for 24 hrs. at room temperature, until they reached a state of equilibrium, after which they were tested for tensile strength and elongation.

Where a lesser number of tests are to be made and where a standard type of electric drying oven is available, this can be adapted to such work, provided a mechanical agitator is placed inside the oven, to insure an even temperature throughout, and a constant supply of fresh air heated to 160 deg. Fahr. is maintained throughout the test. As an example of one of these electric ovens, the type known as the Freas, with an electric agitator inside, has proven most satisfactory.

The curves herewith show the time-decay relation of the compounds. For a long time tests were always run in comparison with a standard compound, that is, at least two sets of samples were tested at the same time. Thus by comparing with the curve of a compound the age of which was known, the curve of a compound whose life was not known, a reliable indication of the service to be expected from the unknown compound was obtained. Experience based on many thousands of these curves indicates that this method of determining the approximate aging of a commercial rubber product is reliable, and is of great aid to a compounder in a manufacturing plant, since it permits him to study the aging of various compositions.

No attempt was made until recently to determine the probable chemical reactions involved. It seems reasonable to assume, however, that at the temperature employed and with a current of fresh air passing over the samples, oxidation occurs, forming one of the unstable peroxides and at the same time causing an increase in the co-efficient of vulcanization, similar to that resulting from the aging of rubber under normal conditions.

A few of the curves, taken from the records of the laboratory, have been selected which illustrate certain typical characteristics and of which natural aging data were available. The compound used in Fig. 1 is one of the older types so common in rubber thread. This curve shows the change in the elongation and in the tensile strength over a period of seven days. The curves are sharp and the deterioration was rapid. Fig. 2 shows the decay of the same compound, but of different cure. The heavy line is the curve plotted from the data taken from the strips that had been exposed in the aging cabinet. The broken line is the plot from data obtained from strips that had been filed away in a dark room kept at ordinary temperatures and in the dark, and test strips removed at intervals over a period of a little more than five years. From these curves, it is to be seen that the accelerated life test is somewhat more severe than the natural life test, although there is some degree of similarity in the general shape of the curves.

Conclusions

The results of several thousand tests show that the accelerated test has proved to be a valuable means of approximately predicting the relative rate of deterioration of rubber compounds. In a general way the following conclusions were drawn:

1. We consider it more reliable to plot curves and compare them than to consider the percentage deterioration from the original tensile strength.
2. The samples in the accelerated aging test are not hardened as in actual aging, but are definitely weakened.
3. Sulphur changes are noticeable, but not important.
4. Despite the fact that the curves of accelerated and natural life tests are not exactly parallel, the accelerated life test is somewhat more severe in general than the natural life.
5. In the vast majority of cases, too rapid deterioration of rubber compounds is due to over or under cure, and

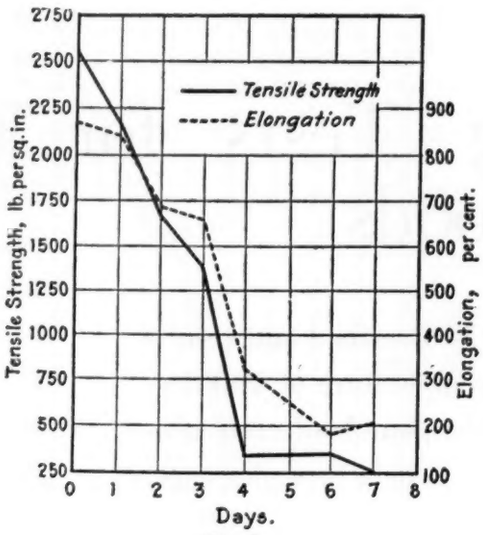


Fig.1

Fig. 1 — Change in tensile strength and elongation over period of seven days.

Fig. 2 — Comparative results of natural life on accelerated aging tests

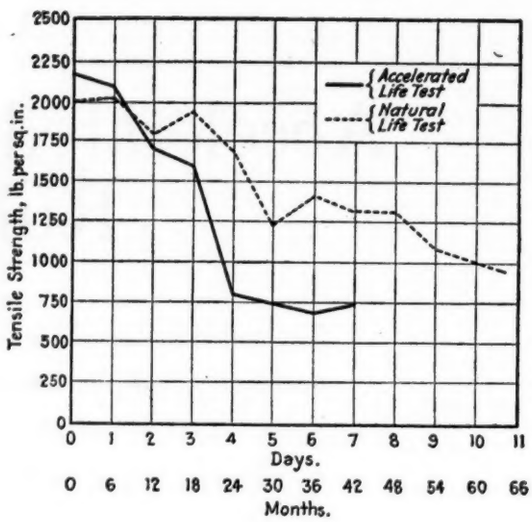


Fig.2

chiefly over cure, and not to any one or more compounding ingredients. The test has been of utmost value in indicating the proper cure. Troubles with organic accelerators, various grades of unfamiliar crude rubber, mineral fillers of various kinds, and so on, have been due chiefly to attempts to graft a new material upon an old practice and often with fatal results.

6. This test is a comparative and not an absolute one and should never be used to compare compounds of different type.

7. When used properly, there has been found to be an approximate correspondence between accelerated life and natural life tests after four days in the oven, of one day equalling six months.

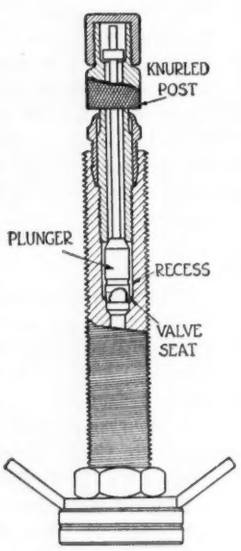
Positive Locking All Metal Tire Valve

AN all metal pneumatic tire valve designed to retain high air pressure, and for which is claimed positive closing and indefinite retention of any degree of air pressure that may be desired, is being manufactured under Holt patent by the All Metal Valve Co. of Detroit.

The construction of the valve is such that there are no springs or rubber employed. It differs from the usual type of automatic valve in that it does not depend on back pressure from within the tube for the maintenance of its air control seat, but is operated mechanically.

A positive, hand-operated screw force is applied to a recessed, non-rigid, metal valve plunger, which force gives a straight ahead, non-rotating plunger to seat metal wedge air seal. There is a recess in the lower end of the plunger to make that part sufficiently elastic to provide a seal without grinding in the seat. It is upon this recess in the plunger that the patents are largely based.

The valve is opened by turning the knurled post, shown in the illustration herewith, one and one-half turns to the left, in which position the plunger under back pressure acts as a check, preventing the escape of the air while the tires are being inflated. When the required degree of air pressure has been obtained, it is closed by turning the knurled post to the right until the plunger is seated.



Cut-away view of all metal tire valve showing construction. The valve is the same overall dimension as type now in use

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IN the course of a lecture to the Association of Drop Forgers and Stampers in Birmingham, Mr. Harry Brearley asked, "Have you ever considered why we use so much 3½ per cent nickel steel? Why the odd ½ per cent? Why not 2 or 3 or 4 per cent? And why does the mention of 3½ per cent nickel steel always suggest a material containing 0.30/0.35 per cent carbon? A reliable answer to these questions would be interesting. So far as my knowledge goes, nickel steel was first used on a large scale for the manufacture of guns, the amount of nickel specified being between 3 and 4 per cent. Such wide limits were necessary because at the time—about 1890—there were no means such as are now available of making rapid and accurate determinations of the amount of nickel in the bath of molten steel due to scrap. Three and one-half per cent nickel was, therefore, a mean figure which allowed the greatest variation on either side. The carbon was 0.30/0.35 per cent because the early carbon steel gun tubes had contained about that amount of carbon."

THE State College of Washington is carring on research along three lines of interest to the automotive industry. These activities are as follows:

1. Growth of cast iron from heat treatment, relative to the treating of pistons to compensate for wear.
2. Power measuring indicator for determining the condition of an engine, relative to wear and adjustment.
3. Correct design for shock absorbers, relative to the value of checking the rebound and the comparative damping necessary on compression and rebound.

A New Instrument for Checking Gear Tooth Profiles and Spacing

Is designed for use in comparing the uniformity or determining the interchangeability of gears. Is applicable to gears of any pressure angle and can be applied while gear is still in the machine.

A NEW instrument, known as an Odontometer, and designed for checking the accuracy and uniformity of gear teeth profiles and spacing has recently been added to the line of precision instruments manufactured by the Pratt & Whitney Co. It is intended for application in production work and in some forms can be applied to a gear while it is still in the machine.

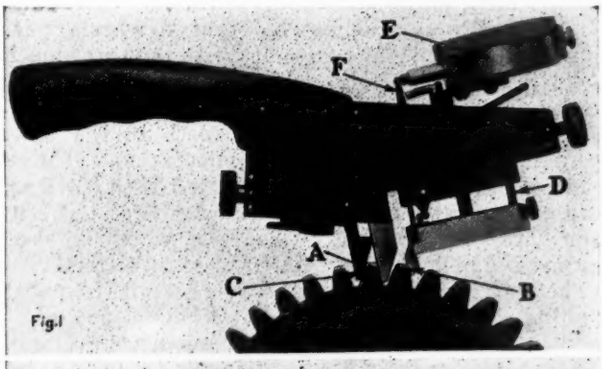
The instrument is, in effect, composed of a section of a straight-sided rack with two parallel effective faces, one fixed and the other movable. A third face, set at an angle to the two working faces, is used to hold the fixed working face in contact with the flank of the gear tooth. The fixed registering surface is at A, Fig. 1, the movable indicating surface at B. The third surface C holds surface A in contact with the involute surface of the gear tooth. The surfaces B and C are adjustable so that gears of various pitches can be tested with the same instrument.

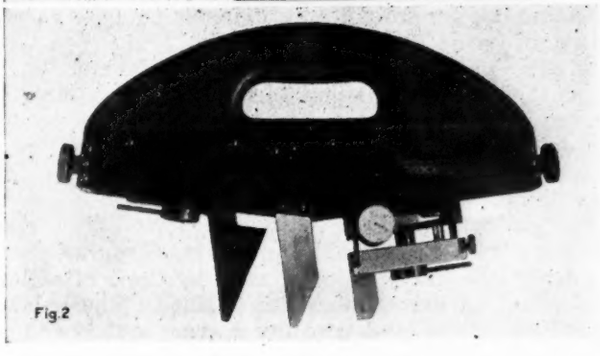
The indicating surface B is mounted on two thin flat springs D, which act as pivots free from backlash. The dial indicator E is actuated by the lever F, which has a ratio of 5 to 1, so that each division on the dial represents a movement of 0.0002 in. of the indicating surface B.

In general the instrument is used as a comparator to test the uniformity of interchangeable and mating gears. If actual measurements are required, the distance between the two parallel working faces of the instrument can be measured.

Stands are also made to hold the two smaller sizes of Odontometers when gears or pinion shaped cutters are being tested. In this case the gear is placed on a surface plate and rolled by the instrument. The actual cutting edge of cutters is tested, so that the errors, of whatever nature, are detected.

These gages are made to check gears in the following range of sizes—¾ to 4 pitch, 3 to 10 pitch and 10 to 24 pitch.





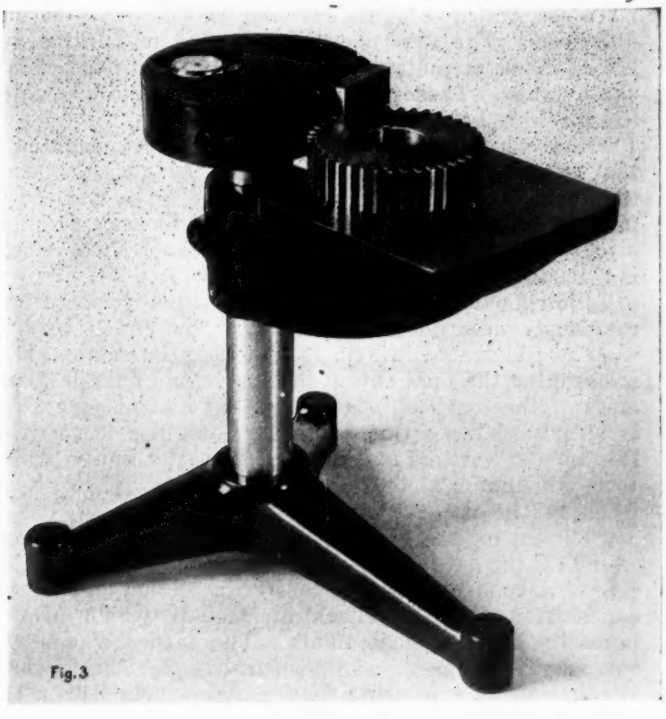


Fig. 1—Odontometer applied to a spur gear to check tooth profile and spacing. Fig. 2—Same type of instrument in a different form. Fig. 3—10 to 24 pitch Odontometer testing gear on stand

Machining Twenty Flywheels an Hour

Methods followed in the production of this part in the Hupmobile plant involve cutting off over one and one-half tons of metal per day. Operations described include cutting of teeth which mesh with starter pinion and balancing by a rapid and simple method.

By J. Edward Schipper

THE manufacture of flywheels for automobile engines involves the use of machines which are adapted for heavy cutting and yet which must give accurate results in the finished product, so that an inaccurate or unbalanced flywheel does not offset all of the good that a very carefully balanced crankshaft secures. It is, of course, just as essential that the flywheel be in balance as the crankshaft, as the two together may be considered a revolving unit and are only made separately because of convenience and economy in manufacture. One is just as important as the other from a balance standpoint.

In the flywheel department of the Hupp Motor Car Co. it is possible to put through 180 flywheels in a 9-hr. day. The finished flywheels weigh 54 lb. and the rough castings 72 lb., so that 18 lb. of metal is removed from each flywheel, or, if the plant is working at capacity, 3240 lb. of metal are removed in a working day. A department which cuts more than 1½ tons of metal per day is of necessity one which is adapted to high cutting speeds. For the heavy work, the Hupp company has chosen the Bullard vertical turret lathe. There is a battery of these machines which roughs out and finishes the various diameters. The first operation is that of turning the inside diameter, outside diameter and facing the crankshaft flange. These are all roughing operations which the machine handles very rapidly.

The second operation on the same type of machine is that of roughing and finish turning the gear diameter, the inside of the clearance, the web of the wheel and finish turning the crankshaft flange. This same machine also bores and reams the crankshaft center hole, which is 3 in. in diameter.

Following this operation, all of the turning operations previously described are finished. The finish turning work is illustrated in Fig. 1, where the machine can be seen taking the final cut on the inside and outside diameters of the flywheel. The mounting for this operation is clearly shown. One of the outstanding features of this type of vertical machine is its great rigidity, which tends to eliminate tool chatter, which is apt to occur whenever heavy cuts are taken in cast iron.

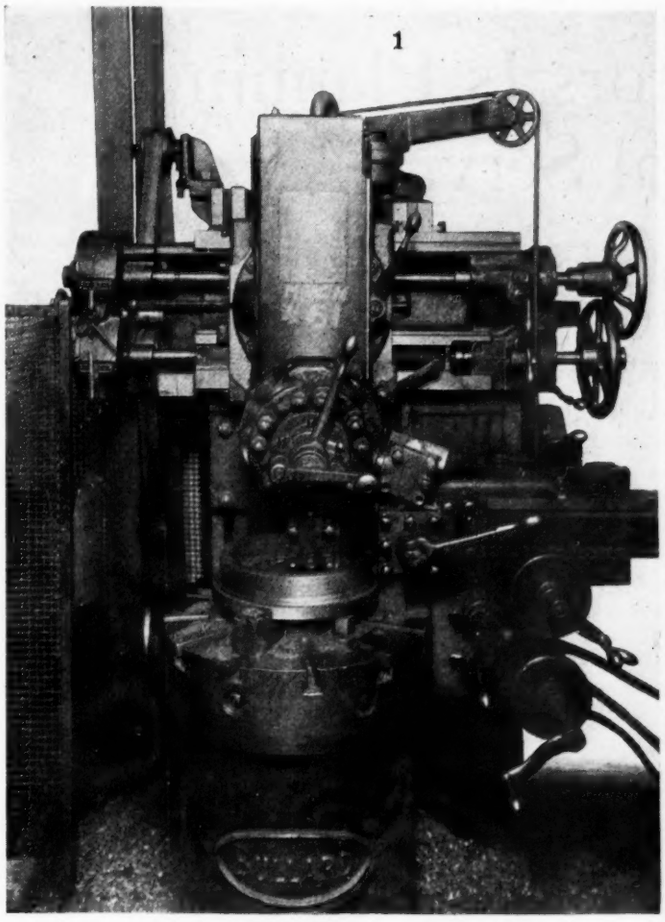
AFTER the flywheel has been shaped out and the turning work completed, a very careful inspection is made for concentricity and to check dimensions which are of necessity held to close limits. The inspector employs two amplifying gages as shown in Fig. 2. The flywheel is centered on a rotating fixture and is held within the limit of 0.005 in. on the amplifying gages. The flywheel is clamped in place at the center and bolted firmly so that it must rotate exactly on the axis.

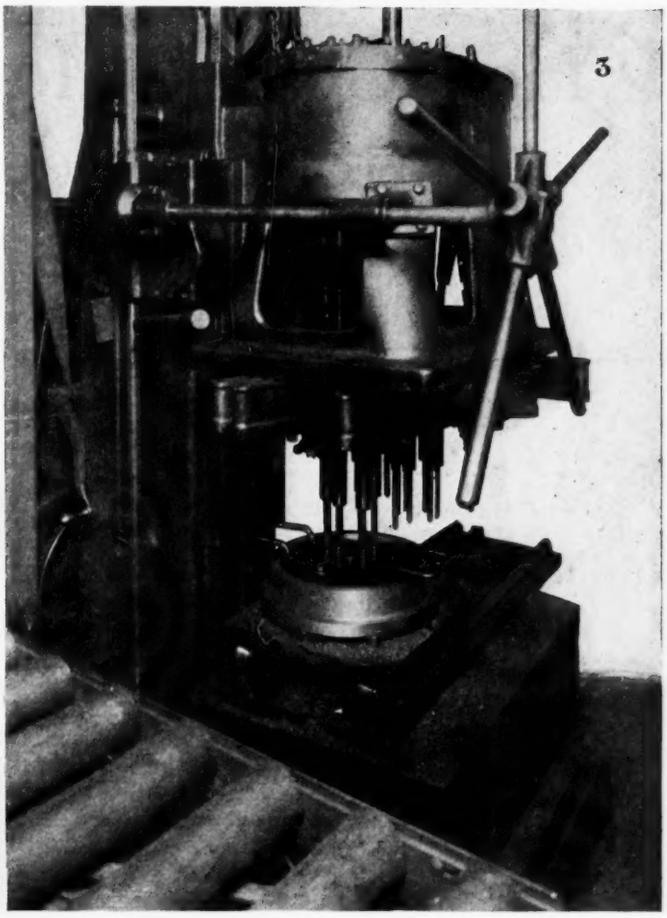
The crankshaft bolt circle and the three clutch stud holes are drilled on a Natco multiple spindle drill, the flywheel being located on a mandrel through the crankshaft center hole. The same operator also drills the three clutch stud holes, as well as reams and spot faces them. The change-over in the cutters is made by means of Magic chuck. The layout for the Natco drill is shown in Fig. 3. As will be noted, the jig employed is a railway type operating on knife edge rails beneath the two heads of the machine. For convenient handling of the piece, two handles form part of the upper section of the fixture. The fixture goes against stops which bring the flywheel into proper position for the different operations. The flywheel casting rests on raised plugs or dowels on the fixture, providing ample clearance for the drill chips between the face of the flywheel and the top of the jig.

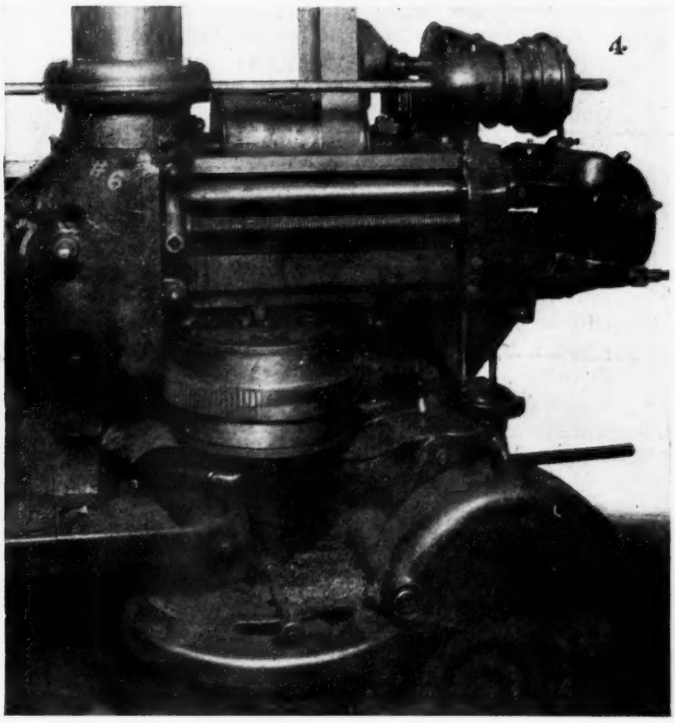
FOLLOWING the drilling of the flywheel, the teeth for the flywheel gear are cut on a Fellows gear shaper. Three of these machines are in use and, as will be noted in Fig. 4, two flywheels are placed back to back and the gears cut at the same time. It takes about 16 min. to cut the teeth on two of the flywheels, so that each machine handles approximately eight flywheels per hr., giving the department a capacity with the three machines of 24 flywheels an hour, which is ample for production needs.

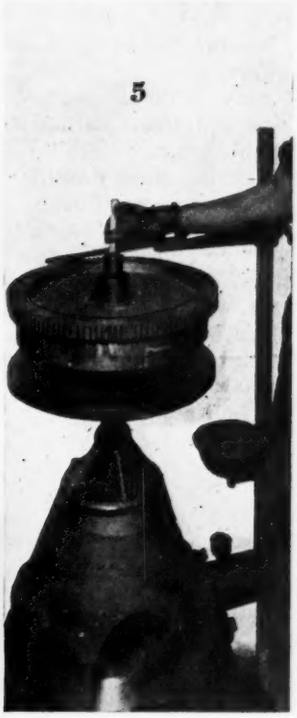
Following the cutting of the teeth in the flywheel, there is a thorough inspection operation. The three stud holes, for instance, are inspected with a triangular fixture which does not pass the flywheel until it fits over three check studs. The gear wheel is also run against a dummy starter pinion to test the teeth.

The final operation on the flywheel is to put it in running and static balance. The wheel is put on a center point balance, allowing it freedom in every direction and is spun around for a dynamic balancing test. A piece of soapstone is held lightly against the wheel and allowed to trace lines at several different distances from the center. It is possible by examining these lines to see if there is any waviness in them, thus to detect an out-of-balance condition. The width of the line also is used as a guide, for, if it is heavier at one point on the periphery than another, it is an indication that the wheel is bearing more heavily against the soapstone at that point. For static balance it is, of course, possible to detect the heavy point at once by the inclination of the wheel on the center point balance. The balancing stand is unique and provides a very quick and easy method for putting the heavy flywheel into balance. A drill placed nearby offers the means for taking out any weight necessary to accomplish the balancing.









1—Finish turning inside and outside diameter of Hupp flywheel on Bullard vertical turret lathe. 2—Primary inspection after turning of Hupp flywheel. This determines whether the wheel is out-of-round, out-of-true or eccentric. 3—Drilling bolt circle and three clutch stud holes in Hupp flywheel on Natco multiple spindle drill. 4—Fellows gear shaper putting teeth on two Hupp flywheels at one time. 5—Putting the Hupp flywheel in balance on special center point balancing stand. This is for both static and dynamic balance

How General Motors Is Planning to Give Ideal Service

Three-quarters of a million dollars to be invested in new service station designed especially for benefit of Buick and Oakland owners in the Metropolitan district. Every convenience for customers and for promptly and efficiently handling repairs.

By J. Howard Pile

GIVE the service customer prompt, courteous attention, repair or adjust his car quickly and efficiently, work as hard for his good will after he has bought his car as when he is thinking of buying it; in short, make service a real partner of sales—this is the idea behind the building in New York of a huge service station with the most modern layout and equipment to care for the needs of Buick and Oakland owners. It will really be two service stations in one. There will be but one roof, but otherwise the big building, already in course of construction, will have all the facilities of two separate service stations, each serving its own class of owners.

It goes without saying that the equipment will be thoroughly up to date. Beyond that, the plans provide for waiting rooms, numerous parts windows, inspection service and special car elevators, along with other features, which will speed up attention to the customer and make his visits to the service station convenient and pleasant.

The two service stations will translate into action in New York the ambition of General Motors executives to raise service to owners of General Motors cars to a high plane—all this in keeping with the conviction of these executives that owner satisfaction is the basis of a stable, growing automobile business.

The building is located on the east side of Eleventh Avenue, occupying the block between Fifty-fifth and Fifty-sixth Streets. This gives a floor plan of 200 ft. x 100 ft. The building will be of reinforced concrete, six stories high and the total floor space for the present will be 123,000 sq. ft. Provision is made for the future erection of another mezzanine of 3000 sq. ft., and if desired another floor can be added in the future, which would bring the total floor space to 146,000 sq. ft.

The first floor of the building is from 2 to 3 ft. below grade, and there is no basement, except on the Fifty-sixth Street side, where the boiler room, coal storage room, etc., are located. Both the first and the second floors are divided by a wall, exactly in the center of the building, extending at right angles to Eleventh Avenue. Buick will occupy the first and second floors on the Fifty-sixth Street side and Oakland the first and second floors on the Fifty-fifth Street side. The entire third and fourth floors will be devoted to Buick service and the entire fifth and sixth floors to Oakland service. Thus, the whole building is divided equally between the two organizations, which will have separate employees, machinery, etc.

PROGRESSIVE automotive manufacturers are becoming more and more convinced of the importance of giving prompt and efficient service to users of their equipment. Readers of Automotive Industries will therefore be interested in this description of service facilities which are being provided one of the largest manufacturers in this country.

* * * * *

When one concern makes an investment of $750,000 in a single service station designed exclusively for handling only two of the several makes of cars which it markets, there can be no doubt as to the fact that service plays a leading part in automotive merchandising.

In the center of the building, on the Eleventh Avenue side, there are four elevators, two small elevators for parts and two large elevators for cars. The large elevators are for freight and are entered directly from the sidewalk. The parts elevators are set back so that a truck can be backed up beyond the building line for unloading or loading at the elevator platforms.

Ramps are used on the first and second floors. Owing to a natural grade in the street, it is possible to use a ramp from and to the second floor on the Buick side. On this side of the building there are two large doors, one of them admitting to the ramp to the second floor, and the other admitting to the ramp to the first floor, which, as before stated, is slightly below grade. On the Oakland side the natural grade of the street does not admit of a ramp to the second floor, and two ramps, one on each corner of the building, both run to the first floor. Owing to the boiler rooms occupying a portion of the space on the Buick side, the Buick service offices are located on the second floor, there being only an entrance lobby, stairway and passenger elevator, in the central part of the Fifty-sixth Street side. On the Oakland side there is a waiting room, inspector's room, check room, wash rack, women's rest room, entrance lobby, stairway

and passenger elevator, in the corresponding locations.

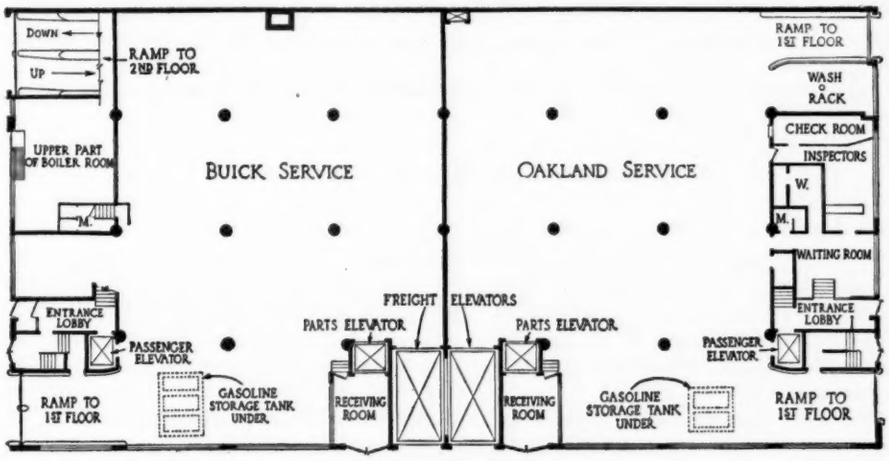
The second floor on the Oakland side has a parts office, service office and private office, and a large lobby with parts counter, with eight windows to the parts room. It is here that Oakland customers will go to purchase parts over the counter. On the Buick side, a portion of the wall space is occupied by the ramp from the street to the second floor, and the balance is occupied by an inspection room, check-room, women's room, cashier and waiting room. Owing to the fact that a portion of the first floor on the Buick side is taken up with the boiler room, it has been necessary to give further space to Buick and a mezzanine to the second floor has been built, containing the technical office, storage room, private office, stationery room, repair office, etc.

The third floor, which is devoted entirely to Buick repairs, has a large open bay, extending clear through from Fifty-sixth Street, nearly to Fifty-fifth Street. There are a number of smaller shops partitioned off with wire screens around the side, these being carpenter and coach tool room, electrical department, locker, lunch and rest room, engine department, etc. The third and fifth floors are practically duplicates, both being fitted up with a large central bay, and smaller shops around the outside. Both are equipped with a system of overhead tracks and trolleys for conveying heavy parts from one portion of the floor to another. There are over 1000 ft. of trackage on each of these two floors, with numerous switches and crosses so that the overhead trolley is available at practically any point in the shop. Switches go into the engine department, machine shop and cover practically every point in the bay.

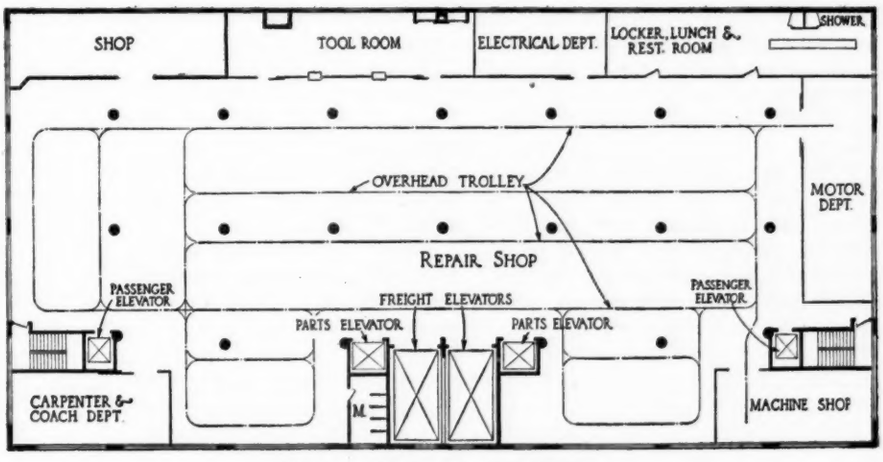
The Buick parts storage occupies the fourth floor, and at one end of the floor is the parts office and files, coat room, claims office, etc., together with a lobby and eight windows to the office and eleven windows to the parts room.

The plans call for installation of storage tanks of 550 gal. capacity buried underneath the first floor, and an oil separator pit, which is also below the first floor level. This is for the purpose of complying with local regulations regarding the separation of oil and gasoline from water before it enters the sewer.

In the planning of this new building every facility is given to both the Buick and Oakland companies to quickly and economically serve their customers and special pains have been taken in the design to prevent delays, due to lack of accommodations counter space or anything of that sort. The first floor will be devoted to quick service.



FIRST FLOOR PLAN



THIRD & FIFTH FLOOR PLANS

Floor plans of new General Motors service station

New Motor Taxation System in England

A NEW system of motor taxation has been adopted in England whereby the owner of a motor vehicle may purchase a license for either an entire year or for three months only. Cost of licenses will drop in accordance with the time of the year in which they are purchased. For instance, a license that would cost £20 in January would cost but £12 in June. The latter would, of course, expire at the same time as the former.

All vehicles are to be taxed at the rate of £1 per horse power per year. The following table shows the rate at which the cost of both the yearly and quarterly licenses for a 20-hp. machine will drop with the progress of the year or quarter:

Month of application for license	License expiring Dec. 31		License expiring end of quarter	
	Per cent of yearly rate	Amount	Per cent of yearly rate	Amount
January	100	£20	30	£6
February	100	20	20	4
March	90	18	10	2
April	80	16	30	6
May	70	14	20	4
June	60	12	10	2
July	50	10	30	6
August	50	10	20	4
September	40	8	10	2
October	30	6	30	6
November	20	4	20	4
December	10	2	10	2

Local Assembly Plants Will Help Secure Argentine Market

Sales will expand as drawbacks are removed. Lack of good roads can be overcome. Local assembly plants will aid to reduce high tariff. Exorbitant license tax can be reduced by proving that the automotive vehicle is an essential unit of transportation.

By M. T. Meadows

TO those interested in the Argentine market for motor vehicles a cursory examination of the world statistics relative to the ownership of automobiles and trucks compiled by Mr. David Beecroft and printed in the Feb. 16 and June 20 editions of AUTOMOTIVE INDUSTRIES reveals much data of real significance.

In the first place it is highly gratifying to note that, given the remarkable progress made by popular-priced American cars in changing the automobile in Argentina from a luxury of the classes to a necessity of the masses, this republic now occupies the sixth place among the nations of the world as regards the number of motor vehicles in daily use—being surpassed in this respect by the United States with 10,500,000, Great Britain with 500,000, Canada with 465,000, France with 240,000, and Germany with 90,000 vehicles.

From the above figures it will be observed that Argentina ranks third among the nations of the New World in ownership of motor vehicles. This is all the more gratifying when it is remembered that owing to the general business depression prevailing since the middle of 1920 the importation of automobiles has been reduced to very limited proportions. For example, only 400 passenger cars and 60 trucks entered the country in 1921 as compared with 4,281 cars in 1912, 5,115 in 1913, 11,031 in 1917 and 7,284 passenger cars and 102 trucks in 1920.

Generally speaking, there is no pride like that of family or race. For this reason perhaps Argentines themselves feel a keener satisfaction upon finding themselves placed at the head of Spanish-speaking countries in the employment of motor driven vehicles, having just double as many cars and trucks (75,000) as her nearest rival, Spain (37,500). That Argentina will continue to hold this enviable place in the Spanish world there can be but little doubt.

Upon examination of the figures covering the importation of automobiles into Argentina from 1900 to 1921 we find that although steady progress has been made over the entire period nevertheless quantities have not always increased year by year but have varied in accordance with the degrees of prosperity or hard times through which the country has gone. From 1900 to 1905 each successive year saw an increase in cars imported. However, in 1907 and 1908, a falling off in imports was noted. From 1909 to 1913 steady yearly increases were registered until in the latter year 5,115 cars entered the country.

The first and second years of the war brought down imports to low levels. This was in part due to inability of European manufacturers to supply the machines—it will be remembered that prior to these years American manufacturers had not yet become strongly entrenched in the Argentine market—but the principal reason, however, for this temporary lull in imports must be sought for in the bursting of the land speculation bubble which ran bankruptcies up to unheard of figures. During this crisis, whose effects would have been severer and more prolonged had it not been for the insistent demand at high prices for Argentina ranch and farm produce on the part of European armies, automobile imports fell off considerably.

The period of prosperity ushered in as a result of high prices received for meat, wool, hides and cereals early in 1916 caused the demand for automobiles to grow by leaps and bounds. During this year 5,929 cars were imported almost exclusively from the United States. In 1917 this figure went up to 11,031, but dropped in 1918 to 5,926 and 4,594 in 1919.

From the above figures it will be noted that the importation of motor vehicles into Argentina has forged ahead steadily in response to the demand for all types of passenger cars and motor trucks. It is to be hoped that, in view of the great services already rendered the country by motor vehicles and also the urgent need for amplifying the existing transportation facilities of the republic, many of whose unlimited resources are not in active exploitation for lack of better transportation means, the importation of automotive products will not only keep pace with past progress but will expand to ever increasing proportions.

UNDOUBTEDLY Argentina is on the threshold of the greatest era of commercial, industrial and mining development in its history. At the same time the swelling tide of immigration now pouring thousands of new settlers upon the shores of the River Plate should mean a great speeding up of production on farms and ranches. New districts will of necessity be opened up; new resources tapped and the purchasing power of the republic reinforced. All of these developments should mean an increased demand for motor vehicles and beyond a doubt American manufacturers will obtain the lion's share of this desirable trade if proper efforts are put forth.

To-day there are many factors which seriously handicap the more universal employment of automobiles, trucks and tractors in Argentina. Some of these are merely temporary; to wit, the present depression through which general business is still going, premium on dollar exchange

resulting in high costs of cars and supplies, etc. With the gradual improvement already being noted this obstacle should soon be a thing of the past. Other drawbacks are of a more permanent character: lack of good roads, high tariffs and heavy licenses.

However, it is only a question of time until Argentina, in common with all other civilized countries, will build modern highways. The evil effects of high tariffs can in part be done away with through the erection of local assembly plants where component parts, which pay lower duties, are put together. Comparatively cheap and relatively efficient labor is available for such enterprises. From the local assembly of cars to the local manufacture, from native materials, of bodies and other parts requiring simple processes seems to be a logical development. Likewise the growing pressure of organizations representing the large body of actual and prospective automobile and truck owners should at last bring the authorities to realize the unwisdom of placing an unnecessarily high license on the use of motor vehicles.

The great advantages which are to be had by American automobile manufacturers through the erection of local assembly plants are worthy of serious consideration, for besides the saving in payments of customs duties, labor costs in the mechanical trades here are about one-half of those in the United States. Labor is abundant and the relations between employer and workmen here are highly satisfactory. Mechanics in the Ford assembly plant in Buenos Aires are paid $8 Argentine paper per day, or at a normal rate of exchange $3.40 United States currency. However, due to the depreciation in the Argentine peso this wage is near $2.75 United States money. From a comparison of the records of the local plant with similar plants at home it is discovered that local labor per man here is just as efficient as the trained men in the Ford assembly plants throughout the United States. In fact as far back as 1919 the local plant here had broken all Ford records in the painting of bodies.

M. T. MEADOWS is Secretary of the American Chamber of Commerce in the Argentine. He has been a close student of automotive conditions in South America for many years.

In this article he tells how American selling policies and methods look from the standpoint of an Argentine observer.

It is generally conceded in Argentine automobile circles that much of the credit for the splendid Ford organization which covers every nook and corner of the Argentine Republic is due to the foresight on the part of this company in seizing the opportunity to take advantage of the conditions which made advisable the erection of a local assembly plant. It is hoped that other manufacturers will follow in the footsteps of these pioneers.

In order that the great popularity already attained by motor vehicles in Argentina may continue to grow there are three serious handicaps which must be eliminated. The most important of these is the lack of good roads in rural districts, for those in the immediate surroundings of our larger cities and towns, though far from being perfect, are at least passable throughout the year.

The construction of good country roads which will permit of the use of trucks and automobiles throughout all seasons of the year constitutes, in Argentina, a very serious problem due to soil conditions. Indeed the fact that Argentina has more miles of railways than modern public roads is explained by the softness of the soil and the lack of road building materials conveniently distributed throughout the different sections of the country.

The more densely populated regions of Argentine territory are made up almost exclusively of open plains devoid of rock, shale or gravel and consequently railroad construction has met with fewer obstacles than the building of highways for auto traffic. Notwithstanding these serious drawbacks there is no reason why the road construction in Argentina cannot be successfully undertaken. In many different regions of the republic stone quarries are to be found from which road building material can be extracted. It is unfortunate that up to the present time no conveniently situated gravel pits have been discovered and consequently the use of crushing machines at the quarries is necessary in order to obtain required materials. Likewise there are a number of State and Federal penitentiaries in the country whose inmates could be employed in this class of work. From the various Argentine universities a group of engineers are graduated each year and some of these could certainly be employed in the direction of road construction.

The Argentine Government is by no means so heavily indebted that it could not easily finance good roads in accordance with carefully drawn plans. From all indications it would seem that the time is ripe for beginning road construction in Argentina since there appears to be nothing lacking except the determination.

Another handicap to more universal use of automobiles and trucks in Argentina are high Custom House duties. There is no just reason why popular-priced automobiles brought into Argentina should pay almost one-half of their factory cost in duties. As the automobile business is carried on at present the Argentine buyers, because of exchange, freight, insurance, custom house duties, importers' and agents' commissions, must pay about twice what the same machine costs American purchasers. Of this additional sum duties make up the larger portion. To the impartial observer it seems that, in fixing such a high duty on automobiles, Argentine legislators consider motor vehicles as undesirable imports. Motor vehicle importers and owners have taken a decided stand in securing reductions in present tariff and it is to be hoped that their combined efforts will sooner or later meet with success.

Readers of *El Automovil Americano* have already had their attention called to the high cost of annual licenses in the city of Buenos Aires. That municipal licenses throughout Argentina are exorbitantly high is generally conceded. Up to the present the central thought of the authorities seems to have been that automobiles are articles of luxury and consequently must be taxed heavily. With the change now taking place in recognizing that motor vehicles are a necessity rather than a luxury it is hoped that such an arbitrary position will be abandoned and a scaling of licenses be undertaken.

No set policy has ever been permanently adopted by the city of Buenos Aires relative to the classification of cars as regards annual licenses. These licenses have at different times been collected according to the horsepower of the machine, weight of the equipped car, number of passengers, etc. In practically every case these classifications have been arbitrary. The proof of this statement is amply borne out by the fact that such changes have been found necessary, for in each alteration an attempt was made to correct past errors.

Despite all of these handicaps there is no doubt but that Argentina will continue to increase its purchases of automobiles and use them on an ever increasing scale.

Politics Prevents Use of Automotive Equipment for Rural Mail Delivery

Trial by Post Office Department in 1915 proved value of automobile in reducing the number of employees and saving of time. Congress passed law in 1916 prohibiting use of motor vehicles because it reduced amount of patronage to be granted "back home."

WITH a total of 44,181 United States rural mail routes in operation, of which but 852 are motorized, the possibilities of a wide use of automotive transportation in carrying of the mails, would, at first glance, seem to be a fertile field for the automobile industry.

The facts show, however, that despite the fact that the Government now has in operation 43,329 horse-drawn rural mail routes, contrasted to the 852 automobile routes, that under the existing law, the wider and more general use of automobiles in transportation of the mails is prohibited by law.

On July 28, 1916, Congress passed a law prohibiting the use of automobiles on mail routes, unless requested by a petition signed by a majority "of heads of families of five or more, who shall in writing request the Post Office Department to permit the use of automobiles for the carrier of their mail." This statute is still in force, and despite the desire of the post office officials to speed up the delivery of rural mails, the department is unable to permit the use of automobiles which would effect a saving of from three to four hours per day of the time of the carrier and enable the mail route patrons to get their mail that much earlier.

Congress Opposes Use of Trucks

To a representative of AUTOMOTIVE INDUSTRIES the story of how Congress had killed the use of automobiles for use in delivery of the mails was told to-day by one of the high officials of that department.

The whole thing in a nutshell, this official declared, was tied up in the evils of patronage. More automobiles, used in the transportation of mail, means the employment of a smaller number of carriers. This means less patronage for the Congressman, and meaning less for him, a majority number of them voted the bill on July 28, 1916, which prevents any mail carrier from using an automobile, unless a majority number of that carriers' patrons on his route petition the department in writing for a special permit to allow the carrier to use an automobile.

The law of July, 1916, was passed after a trial of one year of motorized routes. On March 4, 1915, the Government initiated a movement to effect economy in the administration of the Government. In the Post Office Department it was determined that a saving could be made by using automobiles on rural routes, where the roads permitted, in the transportation of the mails.

It was found that one automobile could handle two horse-drawn mail routes. Operators of automobiles received $1,800 compensation. Horse-drawn route drivers received $1,200—each to furnish their own transportation. By the use of automobiles at $1,800, who handled two routes, each of 25 miles in length, a saving of $600 over the horse-drawn route was made, or approximately 25 per cent.

Inauguration of the motorized routes resulted in the dismissal of a large number of rural mail carriers, with the reaction that Congress the following year repealed the act of March 4, 1915, and passed the law of July 28, 1916, prohibiting the use of automobiles on rural mail lines, except by petition as stated.

In discussing the handicap under which the department is now laboring, the department official declared that despite the fact that the department had sought a repeal of the law in order to permit the use of automobiles in handling rural mails, that Congress had turned a deaf ear to their plea because of the patronage for "back-home" political supporters.

"The department could save a great deal of money in the general use of automobiles on routes where good roads are available, if permitted to use automotive transportation," he said. "The situation, however, is not really as bad as our figures show.

"As a matter of fact, there is no doubt but that a large part of our carriers—possibly half—are now using automobiles in the handling of their routes. Because of the law, however, it is necessary for them to 'cover up' this fact, and our records must necessarily show that the routes are served by horse-drawn mail carriers."

Records of the department show that they have a total of 4306 mail trucks in operation for which there was appropriated last year a total of $15,000,000 for automotive transportation of the mails. This sum of money, however, includes the salaries of mail-truck drivers and mail handlers who go with the trucks, and does not represent monies spent for purchase and maintenance of trucks.

Nearly All Trucks Used in Cities

Practically all of the 4306 trucks owned by the department are in operation in the larger cities, being used for transportation of mail between post offices and depots, and for the collection of city box mail.

Based on the actual showing made by the department in the latter part of 1915 and the first half of 1916, which showed that the rural mails could be delivered by automobiles for approximately 25 per cent cheaper than horse-drawn equipment, it is estimated that the Government could save annually at least 20 per cent of its rural delivery costs.

Some idea of what this would mean to the Government in the way of economy can easily be determined when viewed in the light of the actual facts. While some mail routes cost the Government less than $1,200 per year, others cost more, and it is estimated that the average is $1,200. This figure multiplied by the 44,181 rural mail routes shows that it is costing the Government $53,017,200

annually to transport the rural mails. Based on a 20 per cent saving, which the department estimates could be made, this would show a tidy profit of $10,603,440 annually to the Government if the almost absurd law were repealed.

Stated another way, it would seem, based on the department's own figures, that the evils of patronage for Congressmen is costing the Government, in the Post Office Department alone, ten and a half million dollars a year. This excess cost, however, is lost sight of in view of the fact that it means roughly between 15,000 and 20,000 more rural routes. Accepting the smaller figure as the more accurate estimate, this divided between some 500 members of Congress shows that on an average it affords each one of them about 30 additional "plums" to pass around.

Present Law Absurd

The purpose of this article, however, is not to criticise Congress for its patronage system, which is as old as Congress itself, but to call to the attention of the industry the absurd and totally uneconomical law prohibiting the use of automobiles on rural mail routes unless it was the will of a majority of the patrons on that particular route.

The arguments made against the use of automobiles at the time of the adoption of the law show, as might be expected, that there was no hint as to the patronage question. The argument used was that by extending a 24-mile route to a 48-mile route that it would force the patrons on the route, say from 24 miles on along the route, to wait longer for their morning mail.

For example, patrons who lived along the first part would get their mail early in the morning, to which, of course, there was no objection. Other patrons, however, who lived along the route, say 27, 28, 32, 35 and 40 miles from its beginning, didn't get their mail until around noon, while with a horse-drawn rural carrier it was declared that on the standard 24-mile route the patron who was on the 27th or 28th mile of the motor route would be on the second or third mile of the horse-drawn route, and thus get his mail earlier.

Using this as a fulcrum, the economical program inaugurated by the passage of the law of March, 1915, authorizing motorized routes, was repealed by the law of July, 1916, to the end that to-day the department must perforce maintain more than 40,000 routes, employing as many drivers, which could be handled by approximately 20 to 25 per cent less number of routes and men, and effect a saving estimated at ten and a half million dollars a year.

Another factor in the passage of the "anti-automobile rural mail law" was the active support by the mail carriers' union, augmented by city carriers and collectors, who, according to post office officials conversant with the fight, used their influence with their patrons in bringing sufficient pressure to bear upon members of Congress to enact the absurd measure which is still in force.

Figures of the department show that the total mileage of the 44,181 rural routes is 1,152,000 miles, or an average length of 26.3 miles. It is estimated by the department officials that by using automobiles these routes could be doubled. The department has no accurate data as to what percentage of the rural routes have roads adaptable for automobiles, although it is estimated that fully 85 per cent of the routes have roads on which automobiles could be used the year around.

The department estimates that about 30,000,000 people are served by the rural carriers. In its annual statement it is stated that the rural routes served last year 6,570,867 families. Since March 4 last 282 new routes have been established and 970 routes extended.

In discussing the motor transport service of the department the annual report states: "This service is being reorganized with a view of making it a very potent transportation arm of the postal service, similar to that of the railway mail service. Its growth has been under abnormal conditions, and during the war period, when little attention could be given to uniformity of operation. A fleet of 4000 trucks is used in the delivery and collection of mail in cities and about 5000 persons are employed in this work.

To Standardize 8 Types of Trucks

"It is planned to reduce the types of machines, all of which were received from the War Department, from thirty-odd to eight standard types.

"By air mail, the department has made greater strides than it has in improving the service of the rural motor routes. The air mail service last year covered 1,500,000 miles and carried 50,000,000 letters. Recently the type of plane used by the department has been remodeled, with the result that the department can now carry with the same man-power and fuel twice as much mail as heretofore, which is about 800 pounds, or 32,000 letters."

Mail is not carried by the department across the country by air. It is transported from one point or large city to another, where it is left for mail trains to pick up. Other mail is taken on and advanced to another large city where it is dropped. In this manner more mail is advanced in dispatch than would be if the mail was carried straight through.

With the existing law, prohibiting the use of automobiles, the department is placed in the paradoxical situation of transporting mail by airplane to speed up the service, only to have the time gained entirely lost by loading it (*i.e.*, rural mail) into horse-drawn vehicles for the last lap of its destination.

A Non-Burning Exhaust Manifold Paint

A RUSTY exhaust manifold is unsightly, to say the least, and the manifolds on most car engines get rusty after a short period of use. Various methods of rust proofing this part have been tried, but apparently with little success. A new paint for manifolds, known as Kemick, is now being offered by the American Chemical Paint Co., and is claimed not to burn off. It is a black paint and is claimed to retain its color and stay in place even if the exhaust manifold gets red hot.

The paint consists of a pigment held in a liquid vehicle or binder. When heated the liquid evaporates and the pigment reacts with the iron of the manifold and forms a coating which prevents rust and adheres strongly to the iron itself. A quarter pint of the material is said to be sufficient for the exhaust manifold, exhaust pipe and muffler of four or six-cylinder car.

Before the paint is applied, all oil, grease, old paint and loose scaly rust must be removed from the surface, by means of a wire brush, stiff scrubbing brush or sand paper. Before applying the paint should be thoroughly stirred, and it can be applied either by means of a brush or spray. Kemick is not an outside paint, and when exposed directly to the weather it should be protected by a weather-proof paint.

Concerning Engine Lubrication

Editor, AUTOMOTIVE INDUSTRIES:

The article on performance of lubricants, by Herbert Chase, in your issue of July 6, brings out very clearly the principal points in connection with the fundamentals of lubrication that are receiving special study. The engineering industry in general has hardly ever given really serious attention to lubrication of machinery of any kind. The Mitchell bearing, which was developed within quite recent years, is almost a solitary example of the design of a bearing to maintain an oil film of the theoretically correct kind, and nearly all machinery has always been lubricated on the principle of providing far too much oil so that an adequate quantity will probably reach the points where it is required.

The lubrication of internal-combustion engines is especially complicated, by reason of the necessity for using a common oil supply for bearings and cylinders, and it is probable that the oiling system and the oil itself, for at least the conventional gasoline engine will always have to be a compromise.

IN this interesting and timely letter Mr. Clayden brings up a number of important points concerning engine lubrication which it will pay the engineer who is concerned with lubrication problems to study.

There is far too little constructive study of engine lubrication, and while the modern automotive engine is undoubtedly better lubricated than it was a few years ago, there is much still to be done before an approach to the ideal is attained.

One of the most surprising things is the slowness with which knowledge regarding oil grooving advances. It has been fully established for many years that most oil grooving prevents the formation of a proper oil film, instead of aiding its formation, and that, especially where oil is fed under pressure, the best bearing is usually one entirely devoid of any grooving except a single cavity of sufficient size to insure the admission of an adequate quantity of oil.

In an editorial in the same issue you mention the conventional system of drilling a crankshaft diagonally from pin to pin. I would like to point out that this has the disadvantage of supplying oil to the connecting rod bearings, in what is probably the very worst possible place. In his paper, given at the Summer Meeting of the S. A. E., Mr. Bull showed very clearly the advantages of drilling the oil hole in the crankpin from the inside, instead of from the outside. H. M. Crane, during the development of the American design of Hispano-Suiza engine, which has since further developed into the Wright engine, proved conclusively that there is a best position for the drilled hole in the crankpin, and that this position is not radially outward. Mr. Bull has expressed the argument so clearly that no room for doubt as to the correctness of his reasoning remains, but experience leads me to believe that it will probably be a long time before the fundamental correctness of his argument is appreciated as it ought to be.

At the end of Mr. Chase's article he makes mention of the addition of small quantities of animal or vegetable oil to mineral oil, and here he touches upon the most highly controversial subject of all. It may be said, generally, that such additions to mineral oil are capable of improving it in certain respects, but that compounding of this nature has in many cases led to trouble. Due to the instability of the animal or vegetable products. It is also worth while noting that comparatively recent discoveries have shown that mineral oils can be refined in such a way that they are given properties almost identical with those of compounds of mineral with other oils.

As Mr. Chase states, there is no question as to the need for more research, but the subject is excessively difficult owing to the very large number of variables in automotive engines. For instance, on the question of viscosity, while mechanical efficiency may be increased by using a lighter oil, this may be, and usually is, at the expense of an undesirable increase in the noise of operation. The function which oil fulfills in quieting the running of an engine is considerably greater than might be supposed by anyone who had not made actual tests. Incidentally, several engineers have lately been considering the possibility of completely separating the timing gears from the crankcase so that they can be loaded with soft grease and kept quite independent of the general oiling system. The idea has attractions, and in at least one case which came under the writer's observation, the effect of adapting an existing engine to accommodate grease lubrication for the front end was quite pronounced. In a sense, such an arrangement would, of course, be a complication, but it might be worth while for the highest grade of automobile. The temperature would always be high enough to insure a reasonable degree of fluidity in the grease.

A. LUDLOW CLAYDEN,
Chief Engineer Gas Engine Research,
The Sun Co.

Correction

IN an article on chrome molybdenum steel which appeared on page 1274 of the Research Issue of Automotive Industries (June 8, 1922) we attributed to C. N. Dawe the statement that "chrome nickel steel is still the best commercial case-hardening steel for important parts, though chrome molybdenum steel is a serious contender." Mr. Dawe advises us that this should read "nickel molybdenum is a serious contender of chrome molybdenum."

Quieter Valve Operating Mechanisms Feature Recent Car Designs

Good lubrication and other means for preventing excessive wear are important items in minimizing noise. Devices for maintaining constant tappet clearance also important. Use of chain drive and non-resonant construction of chain case are also aids to quietness.

By J. Edward Schipper

ONE of the very noticeable trends in automobile engine design is to be seen in connection with efforts to secure the quieter valve action. This applies not only to the L-head type of engine which has always had a reputation for being the most nearly silent of all poppet valve types, but also to the overhead valve engine. The recent announcement of a large manufacturer of overhead valve engines that he is using a combination aluminum and steel valve push rod is a good example of this tendency. Furthermore, it is particularly noticeable that efforts are being made to properly lubricate the rocker shaft in overhead valve layouts with the rocker arm type of action.

Attention has been called in a recent article in AUTOMOTIVE INDUSTRIES to the increasing use of the chain front end drive. This is also an indication of the same general trend toward silence in the functioning of the engine.

One of the best ways to promote silence in any engine is to make it easy for the owner to maintain it. If the parts which wear are rendered accessible, the owner will be more apt either to take care of it himself, or have it attended to by a service station, since he may reasonably expect that he will not be presented with an abnormally large bill for such service.

It was quite common three or four years ago for valve push rod guides to be so mounted that it was necessary to remove the entire cylinder block to get the guides out. Only in a very few of the up-to-date engines is this now the case. Practically all of the newer engines and those which are to be announced in the near future are so arranged that the valve guide assembly is accessible after removing the cover plate from the side of the engine. These cover plates are now generally being made oil tight as well as dust tight. The reason for this is that in place of running the valve action dry within the cover plate, it has been found readily possible to permit a mist of oil to circulate within the cover and, consequently, reduce wear and maintain silence. Valve cover plates were originally put on primarily in order to give the engine a neat exterior, and exclude road dirt. The oil tight housing is a later development which is proving of considerable value.

ONE of the companies which for years has employed the mushroom tappet has now changed over to the roller follower type. This is not only more nearly silent, but also a more efficient type of valve drive, and, while it is more expensive to manufacture, it gives a noticeable improvement in the quality of the engine if the roller assembly is made to close limits. One of the features of a hardened and ground roller is that, if properly made, the wear will be uniform, and, although wear reduces its diameter, it will still remain round and function properly, while the wear on the roller, as well as the wear on the valve seat can readily be compensated for in the adjustment.

Much of the noise from the valve action is, in some cases, accentuated by the front end gearcase cover. Non-resonant construction here is an absolute necessity if silence is to be maintained. Furthermore, it must be remembered that the front end of the engine acts as a sounding board through which a great many noises due to vibration which does not originate in the timing gears themselves are projected. There is no better way to break up these vibrations than by properly ribbing the timing gear cover.

ON the overhead valve engine silence can be maintained by proper lubrication once variable clearance due to temperature changes has been eliminated. In the recent development, wherein aluminum is used for the lower part of the push rod and steel for the upper end, the proportion of aluminum and steel is such that the increased expansion of the aluminum which is cooler than the cylinder, compensates for the expansion of the cylinder block and, consequently, the clearance does not alter materially during the rise and fall in temperature.

There is still a weak spot to be solved in valve drive and that is in the frequency with which it is necessary to make valve adjustments. Either the parts are too soft or the adjustment is not properly locked. Whatever the cause may be, it is certain that it should not be necessary to make as many changes of adjustment as are found necessary on the average car. The amount of wear on the end of the valve stem is being materially reduced in some cases by the employment of a composite valve wherein a hard alloy steel stem is employed. There are some engineers, however, who believe that one of the real cures for this trouble is to greatly increase the diameter of the bearing end of the valve stem. This increases the area subjected to wear and probably results in a reduction in the frequency of adjustment. Lighter valve parts, secured by the employment of hollow sections, are also of advantage in reducing valve weight and, of course, any saving which is made through reduction of inertia of the reciprocating parts is a decided benefit from a wear as well as from other standpoints.

Automobile Finance Companies Needed to Help Dealers

Some dealers are forced to extend credit almost equal to the total capitalization of their company. Finance corporation is better adapted to meet automobile dealers' needs than small banks.

By Harry Tipper

THE total buying of the railroad field in sales and equipment in a single year is estimated to reach two thousand million dollars.

The peak of buying in the automotive field of motor cars alone reached considerably over two thousand million dollars and the retail price given by the user for passenger cars and trucks in 1922 will reach approximately that figure, unless the industry is hit with a severe setback.

Approximately 75 per cent of these sales are made on a time basis. That means that fifteen hundred million dollars is involved in the credit sales. The amount of cash required on the average in the sale of automobiles and trucks for credit is approximately 40 to 50 per cent. This leaves approximately eight hundred to nine hundred million dollars to be taken care of by the financial institutions. Some of this, of course, is involved in trades which reduce the total amount so considered so that it would not be more than two hundred and fifty or three hundred million dollars.

Therefore, the actual credit required by the automobile retailer from the banks or other financial institutions amounts to somewhere between six hundred and nine hundred million dollars in the ordinary course of the year's business.

Where this credit is advanced by the local bank to the local retailer, it is necessary for the dealer to assume the responsibility for the credit of his customer by endorsing the notes to the bank before he can secure the required amount. Where the credit goes through a financial institution created for the purpose of providing this kind of credit, the customer's note will be accepted with certain provisions on the execution of the proper mortgages on the car in favor of the company which is doing the financing.

A retail dealer selling fifty cars at $2,000 each, approximately, will have to carry a line of credit on these cars amounting to about $45,000 in addition to his regular line of credits required for the operation of his business.

Having in mind the fact that 80% of the cars are owned in towns of 25,000 and less, the normal capital required for the operation of such an institution might not reach over $50,000.

In such case the credit extended on cars bought on time would be almost equal to the total capitalization of the company.

At the present time a great deal of the financing is carried on by the local banks and their operations in this case are similar to their operations in financing crops and stocks and other credit requirements. In proportion to the size of the community, however, the financing of the automobile truck is a heavy matter because the units are large and the depreciation is so much greater than the depreciation involved in many of the other items.

The development of the financing corporations for automotive purchases by the individual is a necessary requirement of the very rapid growth in the automotive market and the impossibility of securing well settled means of financing all these items during so short a time. The automotive business, as a business of volume, is not more than ten years old, and the large percentage of that volume has been developed within the last six or seven years. All methods of financing automobile purchases, therefore, are as yet more or less experimental and have not developed to the point where they can be examined for their comparative value without many reservations.

Considering the fact that about 80% to 90% of the buyers of automobiles have owned this kind of equipment before, and also considering the amount of money involved in the purchase of cars, it is not likely that the credit transactions will grow less. It is probable, in fact, that they may invade the used car field to a greater extent and involve a larger percentage of the total car market than they have done in the past.

The number of people who have available the amount of money necessary to pay cash for an automobile, without sacrificing some other investments, is comparatively small and the deferred payment is required not only for the purchaser of the cheap car but for purchasers of other cars as well. Undoubtedly, the deferred payment operations became a definite and regular part of the automotive sales, because retailers and sales managers saw how greatly the market might be extended if cars could be sold on the deferred payment plan.

The advantage to the dealer in dealing through a finance corporation, supervising automotive purchases, lies in the fact that most of these companies will take the notes of the purchaser direct with a chattel mortgage on the car so that the dealer's credit is not involved. The dealer secures the full payment for the car; his own credit obligations are kept within reasonable bounds and he is in a position to make a larger margin of profit on his turnover. This is not true of all finance corporations. A number of these corporations do business practically in the same way as the banks—that is—they require an endorsement of a note by the dealer so that he becomes responsible for its payment. In other respects,

the credit is established on a standard basis so that the credit conditions are known and can be depended upon.

In the case of securing the financing from the local banking institutions, the amount which they will loan upon the individual purchase, is a matter of depreciation and the dealer cannot be sure to what extent he is to secure credit for the notes as this depends upon the estimate of the bank as to the value of the notes themselves.

This makes it a good deal more difficult for the dealer to figure on his business and to make deals with his customers for the purchase of automotive equipment. It is almost impossible for him, unless he has a sufficient line of credit or cash of his own, to complete a deal with the customer until he has determined how far the bank will go with him in the advancement of credit on the basis of such notes.

It is the custom in many banks in smaller towns for each note transaction to come up before the officers or directors of the bank for their approval before the credit can be advanced to the depositor. In such cases, the individual loans from local banking institutions become involved in a personal equation and reaction of the officers and directors to the individual case. This has its advantages, but it also has very grave disadvantages because of the uncertainty of the credit and the difficulty of meeting the market requirements on any standard ground. The general market for automotive apparatus, particularly cars, is governed by the situation in the smaller towns and cities because the large market for future sales and replacements lies in these sections. In these sections the bank transactions are handled much more largely on the basis of the personal equation and the individual case, because of the intimate knowledge existing between the bank officials and directors and the people of the community.

Anything which develops uncertainty in connection with the business of retailing automobiles and trucks, operates to limit the market and delay the sale. Some uncertainty must exist at all times, but the operations of finance corporations, properly conducted, permit the removal of most of this uncertainty in the transaction of the business.

The finance corporation, adequately capitalized and properly managed, dealing with thousands of individual purchasers, and with dealers in many sections, is in a position to develop actuarial statistics in connection with its work which will provide a proper balance between the charges of average losses so that the entire credit will be on a sound basis. The local bank is in no position to conduct business along such lines. The loss in a single case will have too large a bearing upon the future loans and is likely to change the policy of the banking institution in its later credit to the dealers in the vicinity.

Generally speaking, from a theoretical standpoint, the finance corporation dealing with small loans in the thousands has a better opportunity to determine its business along practical lines than the local banking institution. A few years' development will enable these finance organizations to minimize their losses, establish the proper clearing house information, and develop their charges along similar lines to the insurance companies who have succeeded in getting stable rates on the most variable of statistics because of their establishment of the right conditions and averages through the examination of the trend in these thousands and thousands of cases.

It is to be expected that the same thing will develop in connection with the finance organization and its work in the automotive field. As this does develop, it should largely take the place of the local banking institution as an organization for the financing of individual purchases of automobiles and trucks.

Tractive Resistance of Roads Studied

INITIAL results secured from an investigation of the tractive resistance of roads indicate that information will be secured of great value to the highway engineer and the user of motor transport. The investigations are being carried on under the auspices of the Advisory Board on Highway Research of the National Research Council with which the Bureau of Public Roads, United States Department of Agriculture and the Quartermaster Corps, United States Army are co-operating.

One phase of the investigation shows that there is a great difference in the power required of the engine when a truck is traveling over different types of surfacing, the amount being more than twice as great on some of the lower types when compared with that on higher types. It is also shown that the power required to overcome the road resistance is not proportional to the speed of the vehicle, and after a certain speed is reached increases very rapidly.

The investigation when complete will cover tests with various types of motor vehicles with the load, tire and spring equipment varied on different types of surfacing and at varying speeds. The data will include gasoline consumption, internal engine resistance, wind resistance and road-surface resistance.

When carefully analyzed it will aid the highway engineer in determining under a given set of conditions what type of surface should be built for a given volume of traffic to result in the least total cost for road and vehicle operation. The same sort of study will be made as to expenditures for grade reduction to reduce operating costs.

The truck operator will be given valuable information on the effect of tire and spring equipment, lubrication, size of load and speed of vehicle on fuel consumption which should aid him in producing cheaper transportation.

Correction

T. A. BOYD, one of the authors of the paper which we printed in our issue of July 6, 1922, under the heading "Measuring the Tendency of Various Fuels to Knock," calls our attention to the fact that the caption for Fig. 3 and Fig. 5 were interchanged, as they were also on the preprint of the paper furnished us by the Society of Automotive Engineers. The cut over the caption marked Fig. 3 should have been placed over the caption for Fig. 5, while the cut over the caption marked Fig. 5 should have been over the caption marked Fig. 3.

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Sales Experts

FACTORY representatives play an important part in retail truck selling at the present time. Their activities include not only instructing the dealer in selling methods but also the actual work of interviewing the prospect in certain cases.

Consequently the methods of factory representatives should be the best known for truck selling work. They should be experts in merchandising methods as well as in knowledge of the component parts of the truck. Their scope of influence is wide. Their opportunity for constructive work is broad, but the danger of broadcasting poor methods is just as great. Such factory representatives should receive careful instruction before being sent out to aid dealers in making sales. Otherwise it is like the blind leading the blind.

A factory representative of a nationally known truck company went out to help a dealer sell a truck to a farmer the other day. After some difficulty the farmer was induced to come out to the road from the field where he was working to look at the truck. As he came out, the farmer kept protesting that he didn't want a truck; that he had no use for one, etc.

When the farmer did get out to the truck, the factory salesman started in to tell him all about the strong rear axle, the excellent body construction, the fine material used in making the frame, etc. Not a word about transportation. Not a suggestion as to how that truck would fit into the farmer's working plans, how it would save money or time for him; how it would be an efficient transportation tool.

The factory representative was talking to the farmer about the things that interested him as the salesman, not the things that interested the farmer as a possible user of the truck.

In the meantime the local dealer stood by getting education in truck selling methods.

Political Sop

IT is a pathetic commentary upon the Federal Government to allow a coterie of men to serve their selfish ends at the expense of efficiency and economy. There is printed elsewhere in this publication an article showing the effects of class legislation upon sales of automotive products. It is of sufficient importance to claim the attention of the entire industry.

The fact that Congress passed a law in 1916 prohibiting the use of automobiles on rural mail routes, except under certain conditions, indicates that the industry was not alive to the danger of such legislation at that time. The effect of this law which is now on the statute is easily apparent. The law automatically erected an almost insurmountable barrier to the extension of motor routes and the sale of motor vehicles to the Post Office Department.

The elimination of this feature of "spoils" system is urgently needed, inasmuch as it affects every citizen in the rural communities. Restriction of motor routes in the mail service tends to throttle progress and efficiency. The present administration and the majority in control of legislation boast of governmental economies. One is duly astonished that the party in power should allow this opportunist legislation to remain on the statutes. It is at its best a socially repressive policy which breaks down nationalism, and encourages sectionalism and isolation.

Undoubtedly some overzealous legislative agents of the organized rural carriers realized that it would be only a matter of years before motor cars would diminish time and space and become an indispensable factor in transportation. Efforts have been made recently to overcome the effects of this handicap and extend the rural routes, but in each instance the legislation has been tabled. It is high time that the Federal Government should change the situation and give the millions of citizens on rural routes the mail service they deserve. There is no economic justification for the time-worn theory that a motor truck on a rural mail route will abolish three jobs. It is only a question of time before the patrons of world mail service will rise up and demand mail *service* in preference to patronage to a few politicians.

Strikes Throttling Business Revival

By JAMES DALTON

WITH the miners' strike in its seventeenth week and coal reserves vanishing day by day, Washington is preparing to put into effect emergency measures which will provide

1. An emergency pooling of rolling stock under Federal control.
2. Reestablishment of war-time priorities to control shipments.

The consequence will be the throttling of the business revival by shutting off supplies of fuel and materials from industries which will be classed as non-essential.

As Automotive Industries pointed out last week, this industry is peculiarly fortunate because it deals in transportation. It can get along fairly well, in an emergency, without freight cars to transport its finished products, especially when the weather is good.

It can transport to its factories on trucks a good share of the parts and materials it requires for the manufacture of passenger cars and trucks. But it cannot successfully truck its steel supplies long distances from Pittsburgh and other steel centers. Even if it could, the steel mills are feeling the pinch of a coal famine and they are being forced to curtail their operations.

The freight congestion which unquestionably will follow the resumption of coal shipments with grain crops ready for the harvest, undoubtedly will stimulate demand for motor transport, especially trucks. There already are indications that large shippers are preparing to resort to trucks. The present situation probably will do much to hasten absorption of surplus stocks of commercial vehicles now on hand. But at best it will be an emergency solution of an emergency problem.

There is no occasion for the automotive industry to become panic-striken. In fact it is conceivable that it may profit from present conditions. The worst that can happen will be a slowing up of production and that, in the long run, may not be an unmixed evil. The pace of the past three months has been swift and if it continued indefinitely it might lead to all the evils attendant upon tremendous output.

The automotive industry has been notably patriotic in every great national emergency, however, and the present situation is bigger and broader than any single industry. The strikes now in progress, with their attendant complications, will retard by six months completion of the business revival which was well under way and which promised to bring a long period of reasonable prosperity.

One grain of comfort can be found in the industrial disturbances. That is the fact that they have checked suddenly what promised to be a secondary period of inflation, with steadily rising prices and poorly digested expansion plans. Industry as a whole was moving a bit too fast for its own good and unless it had been halted it might have worked itself back into a position analagous to that of 1920, although it would not have been anything like so dangerous.

Booms always are gratifying while they are in progress but the country didn't need a boom. What it did need was a gradual, healthy return to normal conditions. Such a return, to be permanent, must be built on a solid foundation.

There is some comfort, therefore, to be found in the strikes, but not much. Settlements of labor disturbances in the past almost always have been compromises. There has been no machinery to make the adjustments permanent and avert future crises. It has been a case of opportunism. There are many evils in the mining industry for which the operators are in part, at least, responsible. These problems are not impossible of solution.

The present strike was foreseen months ago by Secretary of Commerce Hoover but no steps were taken by the administration to avert it and no move for a settlement was made until the country actually was in peril of freezing the coming winter. The operators themselves have admitted the evils of the industry. The miners long ago urged the appointment of an impartial commission to study the question and make recommendations for reform. These reforms should be permanent and they should put an end to periodic strikes.

That probably will be the program which will be followed in settling the present disturbance. The miners will go back to work at the old scale pending the report of the commission. It may be necessary for the Government to take over the mines temporarily to bring it about but public opinion soon will force action even as drastic as this. Troops cannot be used successfully in America to drive striking miners into the pits and it takes skilled men to dig coal.

Suspension of railroad operations because of strikes has threatened the country every few months for years and the Railroad Labor Board was created to avert strikes. It has failed in its function largely because it had no authority to enforce its rulings. Some amendments must be made to put teeth into the law or a new system of dealing with the situation must be devised.

Persons who have followed closely the readjustment from war conditions have realized that deflation of wages and prices could not be brought about without serious difficulties with labor. Employers have contended that labor was avaricious and overbearing during the stress of war and that it must be taught a lesson. Labor has asserted that capital was trying to destroy unionism. This feeling on the part of the workers makes them the more determined in the present battles because they feel that the future of their unions is at stake.

The automotive industry is fortunate not alone because of its ability to withstand a collapse of the railroads better than other lines, but also because it has been free from serious labor difficulties.

Durant Adds Two Cars to His Line

Gets Locomobile; To Build the Flint

Redesigned Chrysler Named After Old Home—No Change in Locomobile

NEW YORK, July 22.—Two more spectacular moves for the expansion of Durant Motors, Inc., have been announced this week by W. C. Durant.

The first was that Durant will assume the presidency of the Locomobile Co. and control its destinies hereafter.

The second was the incorporation in Michigan of the Flint Motors Co. which will manufacture at Long Island City and in Flint a light six-cylinder car which will sell for $1,180.

The Locomobile announcement, which came first, had been discounted. It did not include details of the financial arrangements under which Durant takes control, but it paid high tribute to the character of the Locomobile and stated emphatically that this car will be continued in its present exclusive class and that it will be manufactured as originally in the factory at Bridgeport. No price change is contemplated at this time. Present owners will be assured of adequate service. Production will be governed entirely by demand.

The present Locomobile Co. will be superseded by a new corporation to be known as the Locomobile Co. of America, which has been incorporated at Albany with a capital of 600,000 shares of no par value. This company will be headed by W. C. Durant. In view of this step, warning has been given by Durant that the shares of the old Locomobile Co. which are being traded in on the Curb market are valueless. Practically all stock of the new corporation will be owned by Durant Motors, Inc.

Details of the terms under which Durant has taken over the assets of Locomobile have not been disclosed, but it is understood he reached an agreement with approximately 90 per cent of both the bank and merchandise creditors under which they accepted a certain percentage of their claims in cash in full settlement. Practically nothing will be left for the stockholders of the old company. The Durant proposition was accepted by the Federal court, by the receivers and by the creditors.

By the incorporation of the Flint Motors Co., which will have a plant at Flint, Durant has kept the pledge he made to the city of Flint, his former home, when

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Business in Brief

NEW YORK, July 24—Uncertainties resulting from the mine and rail strikes have cast a dark cloud over industry and trade generally. The need for fuel is becoming more pressing daily, and serious freight congestion with all its attendant difficulties seems to be approaching.

Iron and steel trades have been hardest hit by the fuel shortage, and probably 10 per cent of the active furnaces in the country have been forced to close. Coal prices generally have been advanced, and considerable British coal has been booked for import, although it remains to be seen whether American longshoremen will unload it.

Distributive trade has been held up by the disposition to go slowly until the labor disturbances have been settled.

Were it not for the strikes the general outlook would be favorable. Western crops have held all the gains made in recent weeks, and cotton has been helped by hot weather.

The building industries still are running at top speed, and final returns for June show that it equalled May. Construction costs are steadily rising, however.

Raw and refined sugars have risen to the highest levels of the year.

Many more New England cotton mill operatives are returning to work, shoe factories are increasing operations and furniture factories have increased their operations.

Car loadings for the week ended July 8 were 718,319, as compared with 876,896 the previous week, and were the smallest for any week since April.

Industrial stocks are higher, rails firm, bonds strong, money easier and exchanges steady.

Bank clearings for the week ending July 20 were $7,061,394,000, a loss of 2.7 per cent from the previous week, but a gain of 17.5 over the same week last year.

NEW KELLY-SPRINGFIELD TRUCK

SPRINGFIELD, OHIO, July 24—A new model truck known as K-61 has been announced by the Kelly-Springfield Motor Truck Co. The specifications are as follows: 5-7 ton capacity, 4½ x 6½ motor, tires 36 x 6 front, 36 x 7 dual rear. The price of this chassis is $4,800.

Tire Fluctuations Threaten Industry

Effect of Goodrich Price Cut Uncertain—Costs Tend Steadily Upward

AKRON, OHIO, July 24—Possibilities of another tire price upheaval face the tire industry following the unexpected announcement of the B. F. Goodrich Co. of a blanket ten per cent cut in the prices of all Goodrich cord tires, and a fifteen per cent reduction on all Goodrich fabric casings, which were made effective as of July 20.

Goodrich is the first major tire company to slash tire prices instead of introducing new lines of cheaper tires in lieu of price cuts, as has been done by several others of both the larger and smaller tire producing corporations in the Akron district.

Last month the Goodyear Tire & Rubber Co. and several smaller concerns took action tantamount to a price cut by introducing new lines of cheaper cord tires to sell at from 20 to 25 per cent below the standard cord tire price lists. The new Goodyear casing is known as the cross-rib.

No Cheaper Line

The Goodrich policy, according to announcement of officials, will not be to continue a standard grade of tires at standard prices and at the same time to put out a cheaper tire in lieu of a price reduction, but will cling to the well advertised, popular and long standing standard Goodrich tires and of adjusting their prices downward to compete with other companies. No revision is made by Goodrich in truck tire or tube prices.

The Mason Tire & Rubber Co. this month made a 28 per cent cut in tire prices, while the American Rubber & Tire Co. increased prices 5 and 10 per cent.

Just what effect the Goodrich blanket cuts will have on other major companies is problematical, for the Goodrich cut comes at a time when nearly all manufacturers admit there is more justification for a price increase than for a price reduction.

In spite of the current trend of thought of tire manufacturers toward slightly higher prices, and despite the apparent justification for such reasoning in the steadily climbing price of cotton, one of the biggest items in tire manufacture, and the attempted corner of the crude rubber market by the British and Dutch governments, the Goodrich company will make its price reductions effec-

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Effects of Strike Becoming Apparent

Material Shortage May Become Acute—Steadily Increasing Shipment Delays

By JAMES DALTON

NEW YORK, July 25.—While the coal and rail strikes have not yet seriously interfered with automotive production, their effects are becoming apparent in such centers of the industry as Detroit and Cleveland. If the walkouts continue another week they will result in a considerable slowing up of operations.

Curtailment of steel production and reluctance of companies to accept orders has brought keener competition and the payment of larger premiums by automobile makers for immediate deliveries of much needed supplies. This shortage will rapidly become more acute.

Parts makers have encountered no actual car shortage as yet, but deliveries of their shipments of finished products and of raw materials to them are showing steadily lengthening delays. Freight congestion is becoming more severe at the strategic gateways, and embargoes are being declared at such important centers as St. Louis.

"Drive-aways" Probable

Passenger car and truck manufacturers will be able to deliver a large part of their products by resorting to the expedient of driving their vehicles from the factories to their destinations but their output will be seriously impeded in a very short time by difficulty in obtaining supplies. "Drive-aways" from the factories are no novelty for automobile makers. The Detroit Edison Co., which supplies power to most of the plants in that city, still has on hand considerable stocks of coal.

The seasonal decline in passenger car sales has become a little more general in the past week but has not reached serious proportions, and is considerably less than normal. If serious industrial stagnation results from the strikes and the shortage of railroad rolling stock, buying power naturally will diminish and the demand for automobiles will fall off somewhat.

The market for heavy trucks is dull but it probably will be stimulated by inability of the railroads to move the freight offered them. Farm demand for light trucks is expected to increase in a short time.

Manufacturers in the automotive field will resort, so far as possible, to the use of trucks to bring in their supplies and they probably will be able to avoid closing their plants, provided the strikes do not cause comparatively complete suspension of iron and steel production. This would be a situation with which trucks could not cope.

Departmental Bonus System Proves Successful Stimulant to Team Work

By E. F. Roberts,
Vice-President in Charge of Manufacturing, Packard Motor Car Co.

Detroit, July 24.

PACKARD has instituted a departmental bonus system of rewarding effort by our employees and for encouraging better workmanship. In the three months since its installation it has been found to be the most satisfactory working arrangement for both employees and company that we have known.

Within a short time the system will be effective in all our departments, entirely superseding the former piece work system which, though successful in stimulating individual effort, lacked the important factor of encouraging organized effort which the new bonus system has been found to develop.

Under our plan a careful time study of the work in a department has been made and a standard of production has been fixed at 80 per cent of the possibilities of the department working at maximum efficiency. As this arbitrary figure is exceeded, the bonus applies upon the wage scale of the men according to the points by which they exceed it. When an eleven point gain is shown, the men receive a bonus of eleven per cent upon their fixed salary.

The bonus applies to every man in a department from the sweepers to the foremen, thereby encouraging everyone to give his best effort. We have already found that where there were shirkers in a department the men themselves have either compelled them to work or get out. Where new men have been taken on, the entire department is interested in perfecting them at the work assigned them. Spare minutes are now being employed in helping the next fellow and by so doing helping the department.

Owing to heavy production pressure, much overtime has been necessary to keep up with sales requirements. Installation of the bonus system has made the overtime unnecessary. In some departments where it was thought extra men would be required, even with overtime schedules, it has been found possible to get the necessary output without either overtime or more men.

Under the bonus plan, no allowance is made for work scrapped. If the work does not pass inspection it is not included in the total output. This has made far more careful work. The inspectors in the departments are not included in the bonus award, so that any possibility of poor work getting by is avoided.

In every department where it has been employed it has proven highly successful. In starting it, we picked out departments that had been on a piece work basis in some cases for fifteen years and it vindicated our judgment. The men are better satisfied in that it makes opportunity for all to partake equally. It encourages the steady, painstaking worker and does away with the tendency to get out work that will pass inspection but is really not desirable from the company standpoint.

Though it has had a tendency to wipe out the high points of the piece work basis, it has kept the rate of earnings about equal to former averages. The system that permitted individuals to make record earnings gives way to a system making for team work. Under the former system, work that was scrapped was paid for because it was uneconomical to have too many inspectors. This is eliminated under the department inspection plan.

THOMART CUTS CAPITALIZATION

AKRON, OHIO, July 24—Stockholders of the Thomart Motor Co. of Akron and Kent to-day approved the company plan of reducing its capitalization by decreasing its preferred stock from $5,000,000 to $2,000,000 and its no par common from 100,000 to 70,000 shares. The decrease is made as a means of reducing taxes. Production at the Thomart plant at Kent is averaging one speed truck a day.

Milwaukee Maintains June Sales Average

MILWAUKEE, WIS., July 24—Dealer business so far in July has come up to every expectation, and while some dealers have not been able to maintain the average of May and June, others are able to report increases in sales. It had been expected generally that, as usual, July might show a uniform decline that might carry through August, with a rising sales curve in September, under the influence of offerings of 1923 models, the exhilaration of the annual state fair in Milwaukee upon local and state business, city and rural, and the seasonal fall buying period.

Thus there has been no real exhaustion of prospects; on the contrary, there is plenty of material for salesmen to work upon. Motor truck sales are increasing.

Associated Motors Plans No New Line

No Additional Plants Until Needed—Sales Offices Centralized at Dayton

CHICAGO, July 24—Further details of the plan of operation of the Associated Motor Industries, the merger of nine automobile and parts manufacturers which was announced two weeks ago, are being worked out in meetings of the board of directors here this week. The board has confirmed many of the actions taken by the organizers and has authorized the officers to qualify the company to do business in the various states.

Will I. Ohmer, chairman of the board, stated that, although it is the purpose of the corporation to take in a number of other manufacturing units, no definite steps toward that end have as yet been taken.

"Additional manufacturing plants will be bought only when needed," he said. "We do not want a lot of idle space, and we are not going to take in additional plants until we are ready for them."

To Run at Capacity

Among other things which he discussed were the future production plans and the financing plans of Associated Motors. He said he proposes to visit each of the plants beginning next week, together with other officials, and make a survey of the possibilities of each factory, and as soon as possible get each one into capacity production.

"I am confident," he said, "that most of the plants can produce twice as much as they have ever produced in the past. They will all be organized along the most economical lines. The whole business will be directed from the central office at Dayton. The Associated Motors owns outright all the other plants, and there will not be any other boards of directors or officers except those of the Associated Motors. We will need at each plant an executive manager and a factory manager."

Specializing Production

He said tentative plans call for the manufacture of all electrical and ignition equipment at the Dayton plant, sheet metal, fenders and the like at the Saginaw plant and transmissions and gears at the Lockport, N. Y., plant. Further specialization of parts production probably will be worked out.

Discussing the financing plans, Ohmer said practically all the securities that would be issued had already been subscribed for. The securities include a $6,000,000 bond issue, which he said has been largely subscribed for by banks holding bonds of the member companies for the retirement of which the Associated Motors bonds are issued. There will be no general offering of stocks or bonds to the public, he said.

He made it plain that the sales policy for all the products of the company will be formulated and directed from the central office at Dayton. A plan to finance retail sales has been worked out and is to be operated by R. A. Crandall & Co., a separate corporation in which the Associated Motors will hold a substantial interest. Details of this plan will be announced soon.

An engineering and designing department will be maintained at Dayton. It is planned to continue manufacturing the National, Jackson and Dixie Flyer cars and no plans have been made for new models, Ohmer said.

288,000 JUNE TOTAL RECORD PRODUCTION

NEW YORK, July 22—Practically complete returns to the National Automobile Chamber of Commerce on production of cars and trucks for June show that the total approximated 288,000. This exceeded by 17,000 the estimate of 271,000 based on returns from companies making 90 per cent of the motor vehicles turned out. It was an increase of 12 per cent over the May record of 256,000.

The June figures, according to the N. A. C. C., indicate a production of more than 2,000,000 motor vehicles for 1922. The output for the second quarter now stands at 763,000.

COVERT GEAR SHUT DOWN

BUFFALO, July 22—The Covert Gear Co. of Lockport, N. Y., which recently merged with other manufacturers of automobiles, trucks and parts under the name of the Associated Motor Industries, has closed its plant on Grand Street for an indefinite period. At the offices it was explained that a readjustment of the departments was under way preparatory to a visit by the executive committee of the new organization. The plant there will reopen. The employees, numbering about 150, claim the action of the Covert company is a lockout against them. Last Friday the men filed with the officials a petition for an increase in wages, asking ten cents an hour more without any piece work.

NEW GUM-DIPPED FIRESTONE

AKRON, OHIO, July 24—A new gum-dipped cord tire has been introduced by the Firestone Tire and Rubber Co. The process used is said to be an old one originally perfected by Firestone and only recently revived. It consists of dipping the fabric for tires in a special rubber gum to add strength and resiliency to the tire carcass. The new gum-dipped cord has been placed on the market at prices to compete with the standard cord tire grades of other major companies in sizes 30 x 3½ up to 34 x 5. The 30 x 3½ non-skid casing is being advertised to the consumer for $13.75.

New Process Gear Plant to Be Sold

Upset Price $1,900,000 — Completes Physical Liquidation of Willys Corp.

SYRACUSE, July 24—The plant and all other assets of the New Process Gear Corp., estimated at more than $3,000,000 in value, will be sold here on August 22 by Mayor George R. Lunn of Schenectady and Francis G. Caffey of New York as special masters appointed by Federal Judge Frank Cooper of Albany. The upset price has been fixed at $1,900,000.

This sale will complete the liquidation of the Willys Corp., of which the New Process Gear is a subsidiary, so far as physical properties are concerned. There will remain, however, several million dollars worth of Willys Corp. treasury assets to be disposed of.

Receivers were appointed for the Willys Corp. in November, 1921, in the equity action brought by the Ohio Savings Bank and Trust Co. of Toledo.

The New Process Gear is to be continued, it is learned through an automotive source. It is understood that strong interests in the automotive field are preparing to bid in the property and carry on the work. The plant, which covers eight acres, is at this time working day and night shifts of men, more than 800 being employed, which is about the capacity of the plant. The work at this time is the manufacture of gears for the Durant and also the new Star.

It is believed probable that Durant may take over the Syracuse interests of the Willys Corp.

John N. Willys acquired the New Process Gear Corp. from the late Thomas W. Meachem and other members of the Meachem family, in November, 1918. All of the $3,000,000 capital stock was taken over in this transaction.

Pierce Would Solve Financial Problem

BUFFALO, N. Y., July 24—Directors of the Pierce-Arrow interests will meet this week to discuss measures looking toward either the reorganization of the company or raising new funds. Some financial interests do not believe assessment of stockholders will be necessary.

This belief is strengthened by the fact that the company has practically no liability other than a bank debt of $7,900,000, and it is believed the banks will do everything possible to avert drastic action.

Response to the company's recent price reduction on passenger cars has been gratifying. Orders have more than doubled since the announcement. Additional men are being taken on and production is expected to reach ten cars a day. Truck demand continues to lag and the truck output is under five a day.

To Develop Safety Formula for Trucks

S. A. E. Help Sought by Highway Department—Sub-Committee to Study Matter

DETROIT, July 24 — Twenty-four members of the truck division of the Standards Committee of the Society of Automotive Engineers met here to-day to examine the possibilities for a safety formula for trucks. Discussion developed the opinion that, in order to meet the requirements of the motor vehicle departments of the various states, it would be necessary to include in the formula suitable static factors of safety on the axle and steering gear as well as a retardation test.

The meeting was called largely as a result of a letter to B. B. Bachman, president of the S. A. E., from A. L. McMurtry of the Motor Vehicle Department of Connecticut, asking for immediate help on a formula which would enable the state authorities to use definite requirements as a basis for passing on the safety of trucks seeking licenses. The measure is particularly necessary in view of trucks assembled from units of doubtful or ancient origin.

A sub-committee has been appointed with instructions to take the matter under immediate advisement.

Some discussion also was engaged in regarding the new small wheel and large diameter tire sizes which brought to light the fact that truck manufacturers are somewhat dubious as to the matter of clearance under the brake arm and overhung bearings with these wheels.

Ford Men Selling Lincoln Everywhere

DETROIT, July 24—Lincoln cars will be sold abroad just the same as in this country—by Ford dealers, that policy having been decided upon by the Ford company. Shipments already have been made to Ford representatives in Manchester, England; Copenhagen, Denmark; Antwerp, Belgium; Bordeaux, France, and Cadiz, Spain, as well as to the branches in Buenos Aires, Montevideo and Sao Paulo.

An initial shipment already has been made to Havana and two Lincolns are on their way to Manila. Shipments soon will be made to China and Japan. The Lincoln will be introduced to Brazil at the Brazilian Centennial, which will be held in Rio de Janeiro in September.

COLUMBUS SALES HEAVY

COLUMBUS, OHIO, July 22—Demand for passenger cars in Columbus and Central Ohio has shown a remarkable increase during the past two months, according to leading dealers and distributors. All classes of cars are selling briskly, but the principal demand centers between $800 and $2,500. In many instances agents cannot make deliveries of cars sold; this applies especially to closed jobs.

The farming sections of the state are buying cars and are paying cash to a certain extent, showing that money is easier in agricultural sections.

Agents and distributors look for a continuation of the good demand for the remainder of the summer months and up to rather late in the fall.

Gardner Announces New Closed Models

ST. LOUIS, July 22—Two new Gardner closed jobs are to be ready for delivery Aug. 1. They are a 5-passenger sedan priced at $1,345 and a business coupe at $1,095. The body lines follow very closely the present phaeton. The business coupe has a wide roomy seat, upholstered in straight grain leather, and there is plenty of leg room. Just back of the seat is a convenient compartment for carrying suitcases, packages, extra tools, etc. The door windows are raised and lowered with automatic rotary type noiseless lifters.

A special roof construction consists of cross bows covered with fine mesh wire screen and heavy duck, which is padded to give a smooth appearance and prevent sagging. Included in the equipment are a corrugated steering wheel, ventilator, sun visor and rainproof windshield.

The sedan has smart straight lines which are accentuated by the finish, which is dark blue with black enameled fenders and nickel plated satin finish hardware inside the body. A forward tilting ventilator throws air around the feet of those in the driving compartment. The windows are fitted with silk shades, and the hardware is satin finish. The four-door design allows easy entrance to both front and rear seats without disturbing those already seated. All doors lock from the inside, except the right front which locks with a Yale lock from the outside.

Closed Car Business Keeping Hudson Busy

DETROIT, July 24—Production of Hudson closed cars during the second quarter of 1922 was at the rate of 54 per cent of the total output during the quarter. The factory declares these figures show that the proportion of closed car business has continued steadily through the warm months, the percentage during the first four months of the year being 55.

Essex closed car production for the second quarter was 41 per cent of its total output, a total that is considered remarkable in view of the price class.

Production of Hudson-Essex in the second quarter of the present year makes it the largest similar period that the company has known. Two of the three months during this quarter, May and June, set up new high output and sales records.

Continental to Jump Output 20 Per Cent

Star Engine Production Nearing 1000 Daily—Plants Well Supplied with Coal

DETROIT, July 22—Continental Motors Corp. will increase its production of passenger car engines in August by 20 per cent over the total in July. This increase, while more marked in its light six model than in others, nevertheless represents an increase in production in all passenger car models. Business in the truck field is fluctuating, the company reports.

Many of its passenger car companies are making commitments on a ninety-day basis at this time, whereas the truck buyers are holding orders to a much closer schedule owing to uncertainties in this field. By reason of the longer commitments the company is enabled to make more prompt deliveries in the car field than in the truck.

Production of the engine for the Durant Star car is steadily mounting and will reach 1000 daily in the near future.

The company reports itself to be well supplied with coal at both its Detroit and Muskegon plants, at both of which it operates its own power-producing plants.

Rolls-Royce About to Produce Bodies

SPRINGFIELD, MASS., July 25—Rolls-Royce of America, Inc., are installing machinery in their branch factory for the manufacture of bodies and will soon have this department in actual production. Owing to the necessity of making the painting and upholstery departments scrupulously clean, new floors and sidewalls have been built in the workrooms of the six-story section of the Knox Motors building, which was leased for the purpose. A force of about 100 will soon be at work there under the management of George W. Kerr, superintendent of coach work, with N. H. Manning as assistant manager and purchasing agent, and Jules Olivier, body designer. At the main plant eight chassis a week are being made, and an increase to ten a week is contemplated when the coach department gets under way. It is stated that orders are now in hand sufficient to keep the factory running on full time through November.

OHIO JOINS N. M. A.

CLEVELAND, July 25—Trustees of the Ohio Automobile Association who met here last week, voted to resign membership in the American Automobile Association. The resignation was telegraphed to Washington, and the trustees then voted to affiliate the state body with the National Motorists Association, which is now made up of 450 clubs in twenty-three states.

Dyer Act Reduces Inter-State Theft

Department of Justice Recovers 2,120 Cars Since Passage in Oct., 1920

WASHINGTON, July 24—A total of 2120 automobiles, valued at $2,567,208 have been recovered by the Bureau of Investigation, United States Department of Justice, since the passage of the Dyer anti-theft automobile law in October, 1920, according to figures of the Bureau. The Department has investigated 2391 cases of stolen cars, involving 4385 persons. There were 2773 arrests made in connection with the theft of the mentioned number of cars, and of this number 1533 has been indicted and 1113 were convicted The average sentence was slightly more than two years in the case of each person indicted for the theft of an automobile.

In a great many cases the investigation was made in connection with the American Automobile Association, who is generally accredited in successfully supporting the anti-theft bill, introduced in Congress by Congressman L. C. Dyer of Missouri.

The outstanding feature of the law is the fact that it places inter-state transportation of stolen motor vehicles under federal law and makes such an action punishable in federal courts.

Before the passage of the Dyer act it was found that there had been built up a growing traffic in stolen motor vehicles by thieves who maintained assembly factories at various points, and who through their ability to transpose parts of various machines were able to so alter a stolen automobile as to make it practically unrecognizable to the original owner. Under the Dyer measure this practice has been materially lessened, says the Bureau.

Gets Locomobile; to Build the Flint

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he organized Durant Motors, that one of its plants would be located there. The factory will be similar in size to that built at Lansing for production of the Durant 4.

The Flint car will be a refinement of the so-called Chrysler Six which was to be manufactured in the huge Elizabeth, N. J., plant of the Willys Corp., which recently was taken over by Durant Motors. When Durant purchased this plant, he acquired the rights to the Chrysler car which had been designed at a cost of approximately $2,000,000. The car will be redesigned and made somewhat larger than the original model. It will include the seven bearing crankshaft and other special features.

The Flint will have its first showing September 15 and deliveries will begin January 1, 1923. It is named after the city of Flint where the main plant will be located.

Flint cars to meet the Eastern demand will also be manufactured at the Long Island City plant, which has been occupied by the Durant Motor Car Co. of New York to manufacture the Durant Four. The building of Durant Fours for the Eastern territory will be transferred to the Elizabeth plant, which is large enough to house both the Durant Four and the new Star.

With the addition of the Locomobile and the Flint to his line, Durant will have factories at Bridgeport, Conn., Long Island City, Elizabeth, Muncie, Ind., Lansing, Flint, Leaside (Toronto) and Oakland, Cal.

The Durant line will include the Locomobile, Durant Six, Flint Six, Durant Four and the Star. He also will control the new Mason truck which will be manufactured in its own plant at Flint and in the Locomobile plant at Bridgeport.

Durant achievements with the General Motors Corp. never were so spectacular as those which have attended the building up of Durant Motors, Inc., to its present size in almost exactly two years.

Locomobile Co. Started in 1899

NEW YORK, July 24—The Locomobile Co. of America, which has just come under control of W. C. Durant, dates its inception back to the first days of the automobile industry. The records show that it was incorporated in West Virginia in June, 1899, at which time the company was manufacturing a steam car, with Amzi Barber of asphalt fame as head of the concern. Barber and John Brisbane Walker bought patent rights from the Stanleys and each formed a separate company, Barber making the Locomobile at Newton and later moving to Bridgeport, while Walker started manufacturing the Mobile steamer at Tarrytown, N. Y.

After three years Barber turned to gasoline, and in the famous New York-Boston run of 1902, A. L. Riker made his appearance with the Riker gasoline car, which then was taken up by Locomobile and the manufacture of steam cars abandoned.

Locomobile started with a four-cylinder vertical motor, located well forward, which practice was adhered to for years. Riker, who had dabbled in electric automobiles and who came from the Electric Vehicle Co., became a dominant factor in the Locomobile company, which became a leader in the high priced class. As such it gained distinction in 1909 by being the first American car to win the Vanderbilt cup race.

Built Riker Truck

During the war the company brought out the Riker truck, which became one of the leaders in this field.

About two years ago Locomobile was included in the new organization, Hare's Motors, along with Mercer and Simplex. Last winter Locomobile withdrew from Hare's and in February went into a receivership which finally has been ended by the deal which has placed W. C. Durant in the presidency.

Milwaukee Reports Parts Demand Heavy

No Let-Up Apparent—Employment Still Increases—Apprehensive of Strikes' Effects

MILWAUKEE, WIS., July 24—Encouraging reports continue to come from the automotive industries of Milwaukee and Wisconsin. There has been no appreciable let-up in demand for engines, frames and parts generally; in fact, July delivery schedules are as urgent as in the last four to five months, and forward specifications are increasing as factories speed up production for the 1923 season.

In retrospect the situation as analyzed by the largest bank in Milwaukee in its monthly summary of business and financial conditions is better than it appeared currently. The July summary says in part: "In the motor field there seems to have been little or no slackening. Parts and accessories manufacturers generally showed increases in employment during the past month. One company making motors increased its working force from May to June. Its sales were 20 per cent better than in the previous month, and 100 per cent better than in June, 1921.

"The motor truck department of the automotive trades is making slow progress as compared with passenger cars, but it is away ahead of the record for 1921," is a significant paragraph in the report. It continues: "Firms making automotive switches, timers and other widely used equipment and accessories have been fully employed and some of them are sold up far ahead. Foundries appear not quite so active.

"The net increase in number of employees for all industries in Milwaukee during June was 2522, or 6.09 per cent; since Jan. 1, the net increase has been 6118, or 16.1 per cent."

So far the railroad shopmen's strike and the coal mining interruption have not had any marked adverse effect on the business of Milwaukee industries. However, much apprehension is expressed by manufacturers with steam power plants and also those using central station current from steam generation, over the possibilities of the situation next fall and winter unless the coal supply is greatly augmented without much more delay. Public utilities, including artificial gas and coke concerns, are showing considerable alarm as well.

STAR MOTORS GETS CHARTER

WILMINGTON, DEL., July 24—A charter has been issued to Star Motors, Inc., with a capital of $100,000,000, which will be a holding company and an acceptance corporation for the various Star enterprizes fathered by W. C. Durant. Star Motors will have branches in every state in the Union. The incorporators are W. C. Durant, C. P. Daly and Carroll Downes.

See South Good Mart for Business in Fall

Improved Cotton Crop Means Money for Cars Instead of a Lull

LITTLE ROCK, ARK., July 24—With the automobile business over the peak in the north, middle west and far west and a lull in sales expected for late July and August, the south, which has been trailing other sections in the volume of business done, is expected to reach its extreme buying power in late August and September.

Automobile sales in Arkansas have been unusually good during June and July, but other sections of the country have absorbed the output to such an extent that thousands of orders are on the books of dealers that are unfilled.

With the practical assurance of a good cotton crop, together with a fair price for the product, automobile factories should find an excellent outlet for a good portion of August, September and October production.

Ford dealers in this section are receiving less than 50 per cent of their requirements, with the result that many other cars in the low price class are being purchased by would-be Ford owners. Chevrolet and Overland dealers are selling all the cars they can get and taking orders for future delivery. Essex, Dodge, Oldsmobile and Oakland also are oversold, while many others are confining sales to cash purchasers.

Used car stock in the hands of Little Rock dealers, with one or two exceptions, are down to the lowest point in three years. Good used cars are bringing better prices than during the winter months and requiring less effort to sell.

If business slows up in other sections as expected, more automobiles will be sold in Arkansas during the fall and early winter months than ever in the history of the state. The cotton crop is estimated at from 1,000,000 to 1,200,000 bales, against 850,000 in 1921.

HUB PROSPECTS MANY BECAUSE OF THE STRIKE

BOSTON, July 24—Some of the Boston car and truck distributors have noticed that the strike has started people making inquiries about the possibilities of getting motor vehicles quickly, if necessary. In talking with dealers some of those looking for cars have seemed to figure out that in case the railroad strike grows worse and food commodities may be a bit curtailed it would not be a bad plan to own motor vehicles to go foraging. And one fellow plainly told a distributor that he was going to buy a car and motor down South for the winter with his family where, with wood enough around to keep warm, he would not be troubled with cold weather. Business men have been inquiring about trucks.

Tire Fluctuations Threaten Industry

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tive at once, reads the company's official statement.

Manufacturers admit they are unable to explain the steadily increasing demand for tires at a time when, according to all the laws of precedent in the automotive industry, it is reasonable to expect a seasonal slump in sales both to car manufacturers and to motorists.

In June many manufacturers began to watch the corners closely in anticipation of a July slump. But July orders exceeded not only expectations, but all previous records. And now manufacturers admit that there are no signs of any diminishing of sales for August, although a glance at the history of tire production for the past ten years shows July and August to have been low months both on tire production and sales for every year.

The Akron district to-day is turning out 105,000 tires a day—above the old 1920 short-lived peak just before the depression period came. The plans for extensive use of automobiles and motor truck caravans to handle commodity shipments, in event of a complete railroad tie-up, may be partially responsible for the mounting demand for tires, but even conceding this fact, the demand is abnormally high for this time of the year.

Goodrich reports that its sales for the last 60 days exceeded all previous records, and that June production was the heaviest in the company's history, with every prospect of July's business going far ahead of June's and making a new record with over 20,000 tires a day.

The Firestone Tire & Rubber Co. reports that it cannot meet the demand for tires. For the first eight months of the Firestone fiscal year, which ends next October 1, the company reports a net profit of approximately $5,000,000.

Goodyear continues its pace of 26,000 tires a day, and the Miller Rubber Co. is straining every department to exceed its present mark of 7500 casings a day, in order not to fall behind orders. The same holds true of smaller companies.

FORD'S IRISH PLANT EXPANDS

NEW YORK, July 24—Announcement is made that the Ford Motor Co. is expanding its Cork, Ireland, plant, so as to be able to ship parts to Manchester, Bordeaux, Antwerp, Cadiz and Copenhagen branches.

Charge Ford Wants Gift from Nation

Norris Denounces Muscle Shoals Offer—Claims Ultimate Aim to Build Automobiles

WASHINGTON, July 24—Characterizing Henry Ford as the head of a "piratical" corporation seeking from his bid for Muscle Shoals a "virtual donation of $14,500,000,000 from the nation," Senator George W. Norris (Rep.) of Nebraska, who has led the fight against the Detroit automobile manufacturer's securing possession of the project, delivered one of the bitterest denunciations ever heard on the floor of the Senate.

The occasion for Senator Norris's remarks was the presentation to the Senate of the majority report of the Senate Agriculture Committee, which has voted 9 to 7 against accepting Ford's offer to take over the Muscle Shoals project. The crux of the Committee's fight waged around Ford's refusal to sign a contract not to make automobiles at the Alabama project.

It was charged by Senator Norris that Ford sought to gain possession of the water power potentialities, which it is said are greater than any project in the world, with the ultimate aim of making automobiles. The Detroit manufacturer was assailed both as to his motives and for his offer to buy the project on "unreasonable terms, and in addition demand that the government furnish all the money for its development and the taxpayers of the country taking all the risk," Senator Norris declared.

Ford Adherents Attacked

Ford's adherents were severely attacked by the report as constantly throwing up barriers to any proposal, government or otherwise, for development of Muscle Shoals other than the Ford bid.

It was charged by Senator Norris that an attempt was being made by Ford to obtain the "greatest gift ever bestowed upon mortal man," and asserted that the public has been victimized by propagandists into believing the Ford proposal a just and fair one. Little merit is seen in any phase of the Ford offer by the majority of the committee. This is particularly true of the 100 year lease term demanded by the Michigan automobile manufacturer.

Huge Cash Gift

Senator Norris said:

"Assuming that a fair interest rate in the commercial world is 6 per cent interest, this would give this corporation during a 100 year period a total gift of cold cash of $236,250,000, and if this money were compounded, as Ford asks the government to compound what he pays, the profits to the corporation at the end of 100 years would be $14,500,000,000. This is more than half our total cost of the world war."

To Use Duralumin in Goodyear Ship

Largest Semi-Rigid Dirigible Ever Designed in U. S. Will Be Built at Akron

AKRON, OHIO, July 24—Duralumin will be used in the construction of the new government semi-rigid dirigible, by the Goodyear Tire & Rubber Co. of Akron, aeronautical engineers of the company announce.

The ship will be the largest semi-rigid dirigible ever designed and constructed in the United States and will be 290 feet long, with a capacity of 700,000 cubic feet of gas. It will be designed and built to carry helium gas in place of hydrogen gas. The bag will be 71 feet in maximum diameter. The ship will be equipped with four Liberty motors and two propellers in conjunction with two reduction gears for the purpose of getting higher propeller thrust efficiency.

The keel of the ship will be entirely of duralumin. The keel will be of triangular cross-section running from nose to tail, with a large structural nose cone and fixed tail surfaces all built into the keel, the idea being that considerable support will be gained from this structural backbone of the ship, thereby reducing car flying pressures.

The ship will have two gas compartments and two air compartments. It will have a speed of 70 miles an hour and will carry 15,000 pounds of gasoline.

The ship will have a crew of 12, with complete facilities for carrying 20, including six sleeping bunks, electrical cooking facilities and many of the conveniences common to modern ocean-going vessels. It will carry three cars—the forward one being 50 feet long and 8 feet wide. The two power cars, each equipped with two Liberty motors of 400 horsepower each will be 20 feet long and 6 feet wide. All cars will be constructed entirely of duralumin members covered with duralumin sheeting. The total horsepower will be 1600. The motors, however will be throttled to reduce this to about 1200 horsepower for the purpose of increasing the durability of the engines. Facilities will be provided for free communication between the three cars through a passageway through the keel of the ship.

Means of getting on top of the huge gas bag will be provided through a vertical shaft 70 feet long, and a machine gun will be mounted on the top of the envelope to assist in protecting the ship during flight. Three other machine gun nests will be located in the lower part of the ship.

M. A. M. A. PLANS FALL MEETING

NEW YORK, July 24—Plans made for the fall convention of the Motor and Manufacturers Association, which will be held in Buffalo, Sept. 13, 14 and 15, call for special sessions of the credit managers, advertising managers, traffic managers and export managers at the Hotel Lafayette. President E. H. Broadwell will preside at the general session. Ezra W. Clark, chairman of the advertising managers council of the association, will preside at the session for advertising managers; W. O. Rutherford, first vice-president, will be chairman of the export meeting; Herman Deuster, manager of the traffic department of the association, will handle the meeting of the traffic experts.

Plans for the meeting of the credit managers are in charge of a committee headed by C. A. Burrell, manager of the association's credit department.

The third day will be given over to a field frolic of outdoor sports, which will be in charge of O. J. Rohde, vice-president of the Wire Wheel Corp. of America, and a committee made up of Buffalo members.

Milwaukee May Have Fokker Air Concern

MILWAUKEE, WIS., July 24—Latest developments in the Milwaukee campaign to secure the location of a new aircraft enterprise sponsored by A. H. G. Fokker, noted Dutch designer and manufacturer, are that a committee of fifty prominent business men is engaged in raising a $100,000 fund. This will be used to make a survey to determine the possibilities of aerial transportation in the United States and the merits of Milwaukee as the center of operations, both for production and for passenger and commercial transportation.

Fokker departed from Milwaukee to sail from New York. His confidential adviser, Frits Cremer, will conduct the survey financed by Milwaukee capital.

Fokker said:

> If the report on this survey is favorable and if Milwaukee will provide a good terminal with land and water facilities and an adequate factory site, I will make Milwaukee my future headquarters and move here from Amsterdam and New York, where I now have factories and offices. I note that enough money already has been raised to assure the completion of the fund and make it advisable to start actual work within 10 days.

NASH SALES MAKE RECORD

KENOSHA, WIS., July 24—In the six months ending June 30 Nash Motors Co. sold more passenger cars than during the entire year of 1921. This also is the largest half year of business in the history of the Nash company. The factory still is behind on orders, and indications point to a continuance of the heavy demand throughout the summer months. Additions now are being made to the four cylinder plant in Milwaukee which, when completed, will enable the company to catch up some on orders. This new building is to be 600 feet long by 100 feet and three stories high. At the same time the Nash Six plant in Kenosha will be in a position to increase its production to a point commensurate with orders received.

Strikes Threaten to Check Output

Rationing of Power Near—Factories at Capacity While Supplies Last

DETROIT, July 25—Increased delay in the receipt of coal, steel and other materials because of the strike situation will lead to a severe curtailment of automobile production in this district unless prompt steps are taken to relieve conditions. The Detroit Edison Co. has awaited the outcome of the conference in Washington before deciding upon the necessity of rationing its power. Unless it can be assured of a coal supply, the company will in all likelihood be compelled to cut off its power from all but essential industries. This curtailment of service will not occur within two weeks, but it is practically certain to come by that time, as the company is now operating with not more than 45 days' coal supply.

All of the smaller Detroit automobile and truck manufacturing companies and parts and material makers buy their power from the Detroit Edison Co. Factories like Ford, Dodge, Packard, Maxwell, Cadillac, Continental Motors and Timken Axle produce their own power and will be able to run beyond this point. The absence of small but essential parts, made by the smaller companies will make their operation futile, however.

All companies have been delayed in getting deliveries of steel, manufactured or raw, for the past sixty days, but this situation has only now become acute. The former three day service from Pittsburgh and other steel producing points has been prolonged to ten days and more.

The time required for the switching and placing of cars for unloading has been quadrupled.

Embargoes on all but perishable goods in some parts of Ohio has required the use of trucks to transport materials and parts to lake ports from whence they are brought to Detroit by boat and then delivered by truck. The boat service between Detroit, Cleveland and Buffalo has been reduced to only night sailings owing to the coal shortage, and there is a possibility of this being suspended entirely. In this event factories are preparing to ship their materials the full distance by truck.

Driveaways of finished cars and trucks have not materially increased owing to the availability of freight cars for shipping and the continuance of some service by the boats.

Practically every factory in Detroit still is operating at capacity. There has been no laying off of help because of falling demand, and indications are that there will be none unless it becomes impossible to operate owing to lack of materials. There are fair quantities of most supplies in stock. There is no factory, however, in position to continue manufacturing for more than thirty days should supplies cease.

Men of the Industry and What They Are Doing

Haynes Going to Europe

Elwood Haynes and Mrs. Haynes will sail for Europe on Aug. 1 for an extended tour of England and the Continent.

Anderson Quits Duesenberg

Harry W. Anderson has resigned as general sales manager of the Duesenberg Automobile & Motors Co., Inc., of Indianapolis. He has made no plans for the future.

Westman Leaves Kant Kut

E. E. Westman has resigned as treasurer of the Kant Kut Tube Products Co., Indianapolis, Ind., to take effect Sept. 1. For several years before assisting in the organization of the above company he was purchasing agent of the Cole and Premier companies. Future plans have not yet been announced.

Appleton Adds to Duties

Robert W. Appleton, production engineer of the Pierce-Arrow Motor Car Co., has been appointed manager of purchases of the company. Appleton will also continue his duties as production engineer. He has been identified with the Pierce-Arrow factory for more than twenty years.

Haynes Advances Tway

The Haynes Automobile Co. announces the appointment of Charles W. Tway to the position of Southern district sales manager. Tway was for ten years a Haynes distributor for the twelve Southern states he will now travel. Headquarters will be maintained at Atlanta, Ga.

Mills to Head Fisher Pontiac

Fisher Body Corp. of Detroit, which recently purchased the O. J. Beaudette Body Co. of Pontiac, announces that Franklin E. Mills will be made general manager of the Pontiac division. Mills has been associated with O. J. Beaudette in body manufacture for the Ford Motor Co. for many years. When the sale was made he was secretary-treasurer of the Beaudette company, and was active in the management of the plant. It is announced that there will be no further change in the personnel of the plant.

Quigley Sent to Toronto

Arthur H. Quigley, assistant general manager of the Kenosha works of the American Brass Co. division of the Anaconda Copper Co., has been transferred to Toronto, Can., as general manager of Canadian interests, the Bronze, Brass & Copper Rolling Mills, Ltd. It is stated on excellent authority that this transfer means the generous enlargement of the Toronto mills to embrace other departments of the brass industry, so that Canadian requirements may be filled. Quigley began work with the American Brass Co. at Torrington, Conn., then the Coe Brass Co., in 1902, as a clerk. He was transferred to Kenosha in 1910, and in 1917 was promoted to assistant general manager.

Cletrac Promotes Soule

Cleveland Tractor Co. announces the appointment of Edward Soule as foreign sales manager with headquarters at the Cleveland offices. From a career as an attorney-at-law, Soule joined the Studebaker Corp.'s foreign department and later held the position of assistant foreign sales manager of the Cleveland Tractor Co. He held this position from the beginning of 1917 until his recent promotion.

Ungar Representing Liggett

G. A. Ungar, consulting engineer and Eastern representative for several automobile parts manufacturers, has been appointed Eastern representative for the Liggett Spring & Axle Co., Monongahela, Pa.

Clark to Represent Davis

Fred B. Clark of Los Angeles has been appointed Pacific Coast representative of the George W. Davis Motor Car Co., manufacturer of the Davis. Clark is widely known to automobile dealers and distributors in that territory.

Murray Promotes Shanahan

J. W. Murray Mfg. Co., Detroit, announces the appointment of George D. Shanahan as general manager of the Detroit plant. Shanahan has been with the company since its inception, and has held the positions of plant follow-up, production manager, and assistant general manager. J. W. Murray and J. R. Murray will continue to have active interest in the Detroit organization.

Crawford Now General Manager

Steel Products Co., Cleveland, announces that F. C. Crawford, formerly sales engineer for the company's plants, has been appointed general manager of the Detroit plant. Crawford succeeds H. B. Garman, who has become works engineer for all the plants, including the main plant in Cleveland and subsidiaries.

Cathcart Leaves Packard

Thomas Cathcart has resigned as head of the advertising staff at the Packard Motor Car Co. to become manager of the Promotional Department of the Crowell Publishing Co., New York. No successor to Cathcart has been named by Packard officials.

Wiggins Joins Holt

E. R. Wiggins, formerly with the Chilton Co. of Philadelphia as technical editor of a tractor journal, has joined the sales department of the Holt Mfg. Co., Peoria, and will do special work as a sales engineer. Wiggins has in the past been connected with the J. I. Case Threshing Machine Co., Aultman & Taylor Machinery Co., and Deere & Co., in their various engineering and experimental departments.

Christensen With Carl Pick

E. G. Christensen has resigned as vice-president of the Ryan Sales Engineering Co. of Detroit, and has accepted the position of sales manager of the Carl Pick Co. of West Bend, Wis., manufacturers of universal joints and propeller shafts.

Schuyler Leaves Scintilla

William A. Schuyler has resigned as president and general manager of the Scintilla Magneto Co., Inc. Schuyler, a native of Switzerland, first became connected with the ignition industry when with the late Edouard Nieuport, inventor of the Nieuport aeroplane. He represented the Nieuport interests in this country. Later on he introduced the Simms magneto on the American market. Also he was European sales representative of the General Motors Export Corp. Schuyler will soon leave on an extended business trip to Europe.

Standard to Market Four Cylinder Model

BUTLER, PA., July 25—The Standard Motor Car Co. will soon be ready to market a four-cylinder car, which will be a companion to the Standard eight. The new Standard factory buildings recently completed at the Butler, Pa., plant are well appointed to take care of volume production. The main assembly building stories and equipped with track system is 800 feet long, 200 feet wide, two of progressive assembly.

COATS DENIES STEWART RUMOR

CHICAGO, July 24—George A. Coats, head of the Coats Steam Car Co., denies a report from Columbus, Ohio, that his corporation has been taken over by the Stewart Motor Car Co. The Coats Steam Car Co. is a selling organization controlled by Coats to market steam passenger cars, trucks, buses and a special light delivery wagon.

The Stewart company is a manufacturing concern which has been licensed to produce, under the Coats design, a car which will sell at $1,085. It is one of a group of manufacturing companies which are expected to make the various Coats products.

Allan Ryan Files Bankruptcy Papers

130,000 Stutz Shares, Given as Collateral, May Be Sold by Bankers

NEW YORK, July 24—The personal failure of Allan A. Ryan has been recorded through a voluntary petition in bankruptcy filed here, with liabilities fixed at about $18,000,000 and assets at $643,533. Secured claims, held mostly by the financial institutions, amount to about $14,000,000. The principal creditors are the banks which took over the management of Ryan's affairs following the famous Stutz corner of 1920. The brokerage house of Allan A. Ryan & Co. and his other business interests are not affected.

Ryan has figured most prominently in the automobile industry through his financial support of Stutz, Stromberg carbureter, Bethlehem Motors and the Times Square Auto Supply Co.

Shares Control Stutz

Francis G. Caffey, receiver for Ryan, will appear before Judge A. N. Hand of the United States District Court next Monday and question the right of the Guaranty Trust Co. to offer at an auction sale on Aug. 2 the 130,000 shares of Stutz stock, which Ryan had posted as collateral for loans. The receiver desires a private sale.

The scheduled auction is based upon Ryan's trust agreement with the Guaranty Trust Co. covering more than $11,000,000 of the $14,000,000 secured claims. The referee's attorney now is scrutinizing this agreement to determine if the auction can be stopped. If it is the standard form of agreement, a stay cannot be granted, for the recognized law in such a case was laid down by the Circuit Court of Appeals in 1907, when it was ruled that the pledgee has the right and cannot be stayed from selling collateral held by it under a trust agreement couched in the ordinary phraseology of such agreements.

Interest in the receiver's proposed action is intensified by the fact that these 130,000 shares mean the control of the Stutz company, there being only 200,000 authorized shares of Stutz issued. At auction, it is felt, the stock would not bring the returns that a private sale would.

May Form Syndicate

Rumor has it that there may be a syndicate formed for the purpose of taking over this Ryan stock because of the company's present financial strength and earnings. John J. Watson, Jr., of New York, one of the Stutz directors, estimates $40 a share as the present value of Stutz stock, an opinion based on the company's report on Dec. 31, 1921, which reported assets and liabilities on the basis of $6.71 of the former for $1 of the latter. At that time the net current assets totaled $2,038,000, and the net current liabilities $302,000. Watson also asserts that at the present time the company has no bank loans and no mortgage on the property.

Whether or not the directors of the Stutz company will unite to take over the Ryan shares interests the financial district at the present time. A special meeting of the board will be held to consider the situation.

In automotive circles there has been considerable speculation over the possibility of W. C. Durant acquiring the Stutz property if control can be obtained at an attractive price. Durant and Ryan are close friends and neither has any affection for Wall Street. It was said at Durant headquarters that so far as known Durant has not given serious consideration to this suggestion.

Selden-Atlas Merger Declared Operative

NEW YORK, July 26—The merger of the Selden Truck Corp. and the Atlas Truck Corp. has been declared operative, and the Industrial Motors Corp., which is to take over the two companies, has been organized under the laws of the State of Delaware with an authorized capital stock of 1,000,000 shares of no par value.

John J. Watson, Jr., president of the new company, said that no new financing would be necessary. The balance sheet of the combined company will show assets of $2 to each dollar of liabilities, Watson said, adding that the Atlas company had virtually no liabilities and the Selden company only about $1,000,000. Numerous companies have made application to be included in the combination, but these will not receive consideration until the organization of the parent company has been completed.

MERGER PLANS COMPLETED

DETROIT, July 24—Details of a merger of the Detroit Lubricator Co. with the American Radiator Co. have been agreed upon, according to a notice to stockholders of the lubricator company. Under the terms it is proposed to exchange the $600,000 common stock and $300,000 preferred stock outstanding of the lubricator company for $3,600,000 shares of a new series preferred stock of the American Radiator, on a basis of four for one, and making $3,600,000 involved in the deal. If the merger is consummated the Americal Radiator will have three plants in Detroit. Part of the plant of the present lubricator company will probably be used for the making of ice machines.

COLE ANTICIPATES DEMAND

INDIANAPOLIS, July 24—Anticipating a good fall business, the Cole Motor Car Co. expects to have its factory running to full capacity by Aug. 1. Orders are coming from all parts of the country and at the present time the company has more orders ahead than at any time in two years.

Price Maintenance Law Cases Dropped

Involved Manufacturers' Right to Fix Retail Prices—No Complaints Pending Adjudication

WASHINGTON, July 25—Formal complaints against seven automobile accessory and tire manufacturing companies were dismissed to-day by the Federal Trade Commission, all of them charged with violations in respect to the resale price maintenance laws. The cases were dismissed by the government, without prejudice to its case, pending the final decision of the Beechnut Packing case, which was selected and advanced by the Federal Trade Commission as a test case.

The cases involve the right of a manufacturer to fix the resale price of manufactured goods. Pending the final adjudication by the United States Supreme Court the Commission has announced that no further complaint against manufacturers who manufacture a commodity and fix the retail prices will be made.

The seven companies against which the government dropped its prosecution are as follows:

Kryptok Sales Co., New York City, lens manufacturers; Curtis and Co. Manufacturing Co., and Curtis Pneumatic Machinery Co., St. Louis, Mo., accessories; Goodyear Tire & Rubber Co., Akron, Ohio; Klaxon Co., Newark, N. J., automobile horns; J. H. Haney & Co., Hastings, Nebraska, tire pumps; Marshall Oil Co., trading as Tungsten Mfg. Co., Marshalltown, Iowa, spark plugs, and The Denver and J. E. Hunt & Co., Baltimore, automobile belt manufacturers.

More Claims Against Standard Parts Filed

CLEVELAND, July 24—Frank A. Scott, receiver for the Standard Parts Co., has reported to the United States court here that there have been filed with him, in addition to the regular claims, contingent claims for work in process and for breach of contracts, in the sum of $1,463,077. These claims were cut down $811,117 and a total of $651,960 has been allowed to these creditors. The total of all claims allowed by the receiver against the company is $9,755,531. To date a total of 25 per cent of the face value of these claims has been paid.

ACASON IN RECEIVER'S HANDS

DETROIT, July 24—Acason Motor Truck Co., Inc., has been placed in the hands of Val H. Kendall as receiver pending adjudication in bankruptcy proceedings instituted by merchandise and bank creditors in Federal Court here.

An appraisement of the assets of the company is now being made by the receiver. The company is declared to have a considerable number of orders on hand and accounts receivable on its books of $58,000.

Railroad Priorities Hit Motor Industry

Automotive Interests Placed in Lowest Classification by Interstate Commerce Commission

WASHINGTON, July 26—Restriction of production by automotive industries is seriously threatened as the result of the car service orders of the Interstate Commerce Commission and plans of the Hoover committees for the distribution of coal. For the purpose of meeting the existing emergency, declared by the commission, automotive industries are automatically placed in the fifth and lowest classification of "other purposes" with regard to plants which are to be served by railroads east of the Mississippi river. The same classification has been given to gasoline, while fuel oil is placed on the preference list for the movement of traffic.

Problems of Handling Coal

If the railroads serving automotive plants can supply their requirements as to incoming shipments of coal and other raw products or can handle their outgoing finished products without interfering with shipments of products on the preferred list, the normal movement will be maintained. But it is not believed that such a movement can be sustained uniformly.

Ruling May Disturb Makers

The acute situation growing out of coal shortage and the necessity of rationing fuel to the favored sources of consumption has caused the commission and the Hoover committee to adopt plans that, it is believed, will be a source of great disturbance to automotive makers. Their plants cannot be operated without coal, and it is plain under the rigid program of the government it will, if necessary, cut off shipments to all consumers not on the preferred list and divert shipments from their plants as they see fit, or even by shutting off the car supply prevent shipments.

While it is too early to say that such a drastic course may be necessary, the fact remains that the possibility of such a condition exists. Under the government plans it can take any or all shipments of coal to plants not on the preferred list, regardless of contracts or agreements, a fact which indicates the sweeping powers of the commission.

Trucks to Haul Gasoline

The elimination of gasoline from products to be given preferred movement means that shipments from refineries, if railroad cars are required for other purposes, will have to be moved on motor trucks. The greater portion of gasoline, however, comes from the mid-continental fields, such as those of Oklahoma and Kansas over lines not affected by the order. It also is recognized that the railroads haul only about 27 per cent of petroleum and its products. But plans for mobilizing motor trucks to handle traffic of various kinds will call for increased shipments of gasoline, and it may be found necessary to give it a preferred movement.

Cadillac Putting Out New Type Closed Body

DETROIT, July 24—A new type of body termed a Victoria but resembling a coupe in its general characteristics is now being put out by the Cadillac Motor Car Co., on its type 61 chassis. The new model, which seats four passengers, has been altered in dimensions to give the effect of greater length and less height. The interior has been considerably enlarged to provide more room for the occupants. The seats are longer and the driver's seat is now placed in such a way that it is directly behind the steering wheel. The auxiliary folding seat, which is beside the driver's seat, is so arranged that it gives added leg room for the person occupying it. The rear seat has also been lengthened and widened.

The interior appointments have been refined by the use of new types of pull-to handles on the doors and other fittings. The features in the former Victoria model have been continued. These include rear corner lamps, parcel compartment directly behind the driver's seat, foot rest, cigar lighter, leather panel sun visor and the rear deck compartment which is large enough to accommodate a small trunk, several bags, golf clubs or fishing kit. The price on the new Victoria is $3,875, f.o.b. Detroit.

WILLYS CORP. RECEIVES REPORT

NEWARK, N. J., July 24—Receivers for the Willys Corp., filing their report of conditions resulting from the financial difficulties of the corporation in the United States District Court, state that the total amount of judgment approved for payment is $663,388. The mechanics' liens, which have been filed but not reduced to judgment, do not exceed $1,200,000. It also is stated by the assistant district attorney that the Government has a claim against the Duesenberg Motors Corp., whose stock was taken over by the Willys Corp., the amount not being announced. As yet the receivers have not been notified of it.

BUICK PLANS BIG YEAR

DETROIT, July 27—The Buick Motor Car Co. has set the biggest schedule in its history for the fiscal year beginning August 1. The largest previous year the company has had was 130,000 and the total output for the fiscal year just ended was 100,000. The company is preparing to launch a vigorous sales and advertising drive that will continue throughout the year, $2,000,000 having been set aside for advertising purposes.

Small profits and large sales will be the business policy of the entire General Motors organization. It is persistently reported that the prices of the 1923 models displayed this week, will be somewhat lower than in the 1922 line.

Lafayette to Move Plant to Milwaukee

New Factory, Next to Nash's, Will Be Operating First of Year

INDIANAPOLIS, IND., July 26—The Lafayette Motors Corp. of Indianapolis will transfer its operations to Milwaukee the latter part of this year, according to an announcement made to-day by Charles W. Nash, president of the company, thereby benefiting by a closer association with the Nash group of industries of Kenosha and Milwaukee, of which it is financially a unit.

Land has been acquired adjacent to the Milwaukee Nash factory, and work will start immediately on a model plant for the exclusive manufacture of Lafayette cars. Nash predicts that the company will be housed and operating in the new factory by the first of the year.

"The Lafayette has been greatly handicapped for space in its present plant," Nash said, "and this handicap will become much more serious as the company's production increases, thus making necessary an increased capacity either here of elsewhere. In view of these conditions and the desirability of a closer geographical co-ordination of all Nash activities, it seemed logical to the directors of our company to establish the Lafayette in a new plant in Milwaukee, even at the sacrifice of the many advantages which have been found in Indianapolis. The new Milwaukee plant will triple the present manufacturing capacity of the company.

"In its new location the Lafayette Motors Corp. will preserve its independent operating integrity, and the management will remain the same. It is naturally the intention to retain the entire organization as thoroughly intact as possible. We are committed definitely to the policy of producing in the Lafayette a car of the highest quality, and the new plant has been laid out with the manufacturing requirements of such a car carefully in mind.

"The Lafayette business has now reached a point where we are able to determine an operating program with some accuracy. While the new plant will take care of all anticipated expansion for the next few years, it will not be too large, with a consequent burden of expense. Every advantage developed up to date, both for manufacturing efficiency and accuracy of workmanship, essential to a car of this standard, will be provided. The location is near the main line of the Chicago and Northwestern Railway.

"Plans have been made to reduce to a minimum the interim between the operations in the present plant and the new one. The lapse in production should be very slight."

It is reported that tentative negotiations are already under way for the sale of the present Lafayette property.

Oldsmobile Reduces List on Two Lines

Prices Also Lowered by Velie and Leach Biltwell—Goodrich Cuts

DETROIT, July 27—Lower prices on the Oldsmobile eight and four-cylinder lines are effective July 30, the reductions on the eight ranging from $100 to $150, and on the four from $30 to $50. Prices on the large eight and the Oldsmobile Economy truck are unchanged. Comparison of new prices and old is as follows:

	New	Old
8 Cylinder		
Touring and roadster..	$1,495	$1,595
Sport	1,725	1,825
Coupe	1,995	2,145
Sedan	2,145	2,295
4 Cylinder		
Touring and roadster..	1,095	1,145
Semi-sport	1,225	1,265
Calif. top tour.....	1,395	1,425
Coupe	1,595	1,645
Sedan	1,745	1,795

Goodrich Cuts Line 10 to 15 Per Cent

NEW YORK, July 24—New Goodrich tire prices announced July 20 are as follows:

CORDS	New Price	Old Price
30 x 3½ cl.....	$13.50	$18.00
32 x 3½ s.b.....	22.95	25.50
31 x 4 s.b.....	26.45	29.40
32 x 4 s.b.....	29.15	32.40
33 x 4 s.b.....	30.05	33.40
34 x 4 s.b.....	30.85	34.25
32 x 4½ s.b.....	37.70	41.90
33 x 4½ s.b.....	38.55	42.85
34 x 4½ s.b.....	39.50	43.90
35 x 4½ s.b.....	40.70	45.20
33 x 5 s.b.....	46.95	52.15
35 x 5 s.b.....	49.30	54.75

FABRICS	New Price	Old Price
30 x 3 "55".....	$9.65	$10.35
30 x 3½	10.65	10.90
32 x 3½ s.b.....	16.30	19.15
32 x 4 s.b.....	21.20	24.95
33 x 4 s.b.....	22.35	26.30
34 x 4 s.b.....	22.85	26.85

BURN OIL TRACTOR CUT

WARREN, IND., July 24—The price of the Burn Oil Tractor, manufactured by the Burn Oil Tractor Co., has been reduced from $1,435 to $1,395.

KALAMAZOO TRUCK REDUCED

KALAMAZOO, MICH., July 24—A price change has been announced by the Kalamazoo Motors Corp. effecting their model G-1, 1½ ton, the price being reduced from $2,495 to $1,800.

WALTER ADDS NEW MODEL

NEW YORK, N. Y., July 24—The Walter Motor Truck Co. has added a new model to their line. The specifications are as follows: Walter, M 2½ ton, motor 4½ x 5¾, tires 36 x 4, 36 x 8, double reduction drive, and is priced at $3,850.

1,148,788 VEHICLES SIX MONTHS' OUTPUT

WASHINGTON, July 26—Figures compiled by the Department of Commerce from reports made by approximately ninety passenger car manufacturers and eighty truck manufacturers show a total of 1,148,788 motor vehicles produced in the first six months of 1922. Trucks made in the first half numbered 114,058, or almost exactly 10 per cent of the total.

June production totaled 287,875, of which 261,963 were passenger cars and 25,912 were trucks.

Production figures by months follow:

1922	Passenger Cars	Trucks	Totals
January	81,693	9,344	91,037
February	109,170	13,121	122,291
March	152,959	19,651	172,610
April	197,221	22,227	219,448
May	231,724*	23,803*	255,527
June	261,963	25,912	287,875
Grand Total..	1,034,730	114,058	1,148,788

*Revised

LEACH BILTWELL PRICES DOWN

LOS ANGELES, CAL., July 22—The Leach Biltwell Motor Car Co. has announced a price reduction of $1,000 on all their models. The standard price for all cars now being $5,500.

VELIE PRICES LOWER

MOLINE, ILL., July 22—Velie Motors Corp. announces a price reduction on Model 58 open body types as follows:

	Old Price	New Price
2 pass. roadster	$1,395	$1,275
5 pass. touring	1,395	1,275

GRAMM-PIONEER REDUCED

LIMA, OHIO, July 24—A complete revision of prices has been announced by the Gramm-Bernstein Motor Truck Co. affecting the whole line of Gramm-Pioneer trucks with the exception of one model. The price changes are as follows:

Model	Capacity	Old Price	New Price
10	1-ton	$1,365	$1,245
15	1½-ton	1,900	1,750
65	1½-ton	2,500	2,250
20	2-ton	2,925	2,475
30	3-ton	3,275	3,300
40	4-ton	3,995	3,850
50	5/6-ton	4,895	4,450

The model 75-P, 3½-ton remains unchanged at $4225.

AIR MEET POSTPONED

CHICAGO, July 24—The aviation meet, air craft exhibition and aeronautical congress, which was to have been held here Aug. 4 to 13, has been postponed until a time to be announced later, according to an announcement made by Charles S. Rieman, president of the Chicago Aeronautical Bureau.

Suggest Financing Chinese Highways

Would Open Up Automotive Market—Survey Shows Vast Potentialities

WASHINGTON, July 22—American financing of good roads in China has been suggested to the Automotive Division of the Department of Commerce by attaches of that Department in China as a means of creating a market there for automobile exports. China offers the greatest potentialities of any country in the world for the import of automobiles, which is dormant, due to bad roads.

A survey of the automotive market, sent to the Department, states:

The Chinese are doing their best to construct new roads and create markets for mechanical transportation. A highway loan to China of say $100,000,000 would build 20,000 miles of new roads and provide a market for automotive products which would soon exceed the original investment.

The national government has just taken up the question of good roads, which is being continually agitated, and has promulgated rules for the improvement of highways. Some of the provinces have also considered the matter.

The co-operation of the American motor car manufacturers and manufacturers of road materials for the purpose of extending credits for the construction of roads in China would be one of the most important steps in the extension of the American automotive trade.

Motorcycle Prices Have Been Reduced

NEW YORK, July 24—Heavy price cuts have been announced by three leading motorcycle companies on their 1923 models which have just been introduced. The Excelsior Motor & Mfg. Co. of Chicago has reduced prices on the Excelsior Twin and on the Henderson De Luxe as follows:

	Old Price	New Price
Excelsior	$365	$310
Henderson	475	398

The Ace, another four-cylinder machine, has been cut from $435 to $335. It is made by the Ace Motor Corp. of Philadelphia.

The price of the Nearacar has been brought down from $225 to $185, making this machine now equal in price to the Cleveland.

Other motorcycle price cuts are expected within the next two weeks. The other leading twin-cylinder jobs will probably be priced somewhere in the neighbo hood of the Ex.elsior, when new models are announced.

BOSCH IMPORT BAR LIFTED

NEW YORK, July 24—It is announced by the Australian Department of Trade and Customs that the prohibition of importation into Australia of goods bearing the word "Bosch" has been removed.

Manufacturers Lax in Foreign Trade

Department of Commerce Sifts Complaints and Gives Hints for Procedure

WASHINGTON, July 25—The American automobile manufacturers' and exporters' methods of making sales in foreign fields are not redounding to the credit of the U. S. automobile industry, according to letters received by the Department of Commerce from foreign and prospective buyers.

Hundreds of letters are received weekly by the Department from foreign dealers, jobbers, importers and actual purchasers of automobiles, asking for information on American makes of automobiles. Many of the letters contain complaints that the automobile which they desire is sold in their locality by representatives or agents who have not given them satisfactory service through some fault or another. To each of these letters the Department makes replies and immediately takes it up with the automobile manufacturer concerned.

Faulty Approach of Buyer

The largest difficulty of the American exporter of cars to foreign countries, as revealed by the correspondence to the Department is the faulty approach of the foreign buyer.

M. H. Hoepli, acting chief of the automotive division of the Department, whose duty it is to read and answer the foreign correspondence of the division, has made some observations, which, it is believed, will prove of value and interest to the American exporter in his method of approach and in overcoming the foreign competition which is growing more and more marked, the letters indicate.

"Obstacles"

These "obstacles" Mr. Hoepli has summed up as follows:

One-third of the replies were written in an unmistakable tone of condescension, as if the American firms soliciting automobile business were conveying a favor to the foreign inquirer. This method of approach is particularly out of place in Latin countries.

One-third of the solicitations, while not containing any information as to the standing, size and activities of the concern making the offer, stress the fact that they had been in business for a number of years, whereby it was assumed that the prospect in the foreign country did either know all about the American manufacturer or would go through the trouble of securing the necessary data.

One-third of the offers did not contain any information whatever concerning the American firms from which they originated, except in catalogues sent under separate cover.

One-seventh of the letters of solicitation informed the inquirers of the goods that were offered. The other six-sevenths either had to guess or write again for the desired information.

While the foreign inquirers requested c.i.f. quotations, seaport, one-fifth of the American manufacturers only were able to give the desired quotations, while an equal number of firms did not quote any prices at all.

Less than one-fourth of all offers only made mention of letters of credit as a method of payment and a great many of the prices on trucks and passenger cars were f.o.b. factories.

Contrasted to the American method of doing business in some instances with the foreign exporter, the Department states that the thoroughness with which the export business is carried on by competitors of ours makes it imperative that such warning be heeded, especially by new exporters in the automotive field.

It is reported that in similar instances European competitors have quoted prices either in local currency, out of local stocks, c.i.f., local seaport and are either extending from 30 to 90 days credit or else define how letters of credit should be drawn. Under such competition, the Department points out, it is necessary for the American automobile manufacturer to enter the field equipped or lose the business.

New R. & L. Gasoline Cabs in Production

CHICOPEE FALLS, MASS., July 27—A gasoline-engined taxicab to be known as the R & L cab is now being produced by Rauch & Lang, Inc., well known as manufacturers of electric vehicles. At the present time 25 of these cabs are going through the factory, and plans have been made to manufacture 250 of these vehicles at the rate of 50 a month beginning in September. Two body styles are offered—one a limousine at $2,350 and the other a limousine-landaulet at $2,475. The bodies are built by Rauch & Lang and are ruggedly constructed, as they have been specially designed for taxicab service.

The new cab is assembled of standard parts. The engine is a four-cylinder counter-balanced Buda, with cylinder dimensions of 3¾ x 5⅛ in. Other standard units used are Brown-Lipe clutch and gearset, Standard Parts axles, Robert Bosch magneto and Gray & Davis lighting generator. The wheelbase is 112 in. Disk wheels and 32 x 4 in. non-skid cord tires are standard equipment.

The cabs will be sold through selling agents who are being appointed in half a dozen of the larger cities. These agents will act entirely independently of the sales organizations handling the electric vehicles manufactured by this company.

ARGENTINE SHOW ANNOUNCED

BUENOS AIRES, ARGENTINA, July 3 (*By Mail*).—Directors of the Automovil Club Argentino have announced that the forthcoming annual automobile exposition will be held during the first half of November and that it will be opened for ten days. As in past years, the showing will be open to passenger cars, trucks, tractors, tires, parts and equipment, motorcycles, bicycles, and aviation and marine engines.

Truck Trains Pooled to Aid Washington

More Than 500 Merchants Combine to Supply City with Fuel and Food

WASHINGTON, July 26—Automotive transportation will be employed by Washington merchants in supplying the city with the necessities of fuel and food, under a plan already agreed upon and made public to-day by the Washington Merchants and Manufacturers' Association.

More than 500 members of the association have agreed upon a plan of operating truck trains between this city and outside points of supply. A committee has been appointed by the association and now is employed in securing the necessary trucks for use in the truck trains. Economy of operation, it is expected, can be secured by pooling their motor transportation, and an agreement has been entered into among the merchants to turn their trucks, or a certain number of them, over to the truck committee for daily use in the truck trains.

The duty of the committee will be to supply coal and transportation for Washington merchants. Under the plan, it is expected that merchants who have to go long distances for small quantities of goods would lose money on motor truck hauls, but by pooling their truck transportation this loss can be avoided.

AUTO-LITE GIVES MORTGAGE

FOSTORIA, OHIO, July 24—A $3,000,000 mortgage in favor of the Columbia Trust Co. has been issued by the Electric Auto-Lite Co., successor of the Auto-Lite division of the Willys Corp., covering all of the company's property. It secures 10 year 7½ per cent first mortgage bonds issued July 1.

The Allen Motor Co.'s plant, located in Fostoria, is included, a special master's deed, conveying this property to the Electric Auto-Lite Co. having been filed at the same time as the mortgage. The consideration was $4,700,000.

WILSON BODY MAKES ADDITION

DETROIT, July 26—C. R. Wilson Body Co. will complete by September 1 a six story addition to its present plants which will give it about 300,000 more feet of manufacturing space. The building will be a complete unit in itself, the three lower floors being devoted to body building and the three upper floors to the painting, upholstery and finishing departments.

HUPP'S ORDER BOOK FILLED

DETROIT, July 24—That July orders now are equal to June, which was the company's largest month, is the statement made by Vice-President Von Schlegel of the Hupp Motor Car Corp. August prospects also are bright.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

The lack of demand for funds from industrial and commercial sources has been a factor in the pronounced ease of the money market for the last few months. This ease was continued during last week and call loans ranged between 3 per cent and 4½ per cent, as compared with a range of 2¾ per cent to 4½ per cent in the previous week. The undertone was easy for fixed date maturities and funds were in large supply. Sixty and ninety day maturities were quoted at 3¾ per cent to 4 per cent; four and five months' at 4 per cent and six months' at 4¼ per cent, as compared with a range of 4 per cent to 4¼ per cent for sixty and ninety days' and four months' and 4¼ per cent for five and six months, maturities in the previous week. The prime commercial rate was lowered, quotations ranging from 3¾ per cent to 4 per cent, as compared with a flat rate of 4 per cent in the previous week.

The Federal Reserve statement as of July 19 showed an increase of $9,502,000 in gold reserves and $12,282,000 in total reserves. Bills on hand increased $4,821,000, while earning assets showed a decline of $10,098,000. Deposits increased $17,594,000 and Federal Reserve notes in circulation decreased $25,274,000. The reserve ratio increased from 77.3 per cent to 77.8 per cent.

Strike Affects Business Recovery

The sixteenth week of the coal controversy, together with railroad troubles, is having a more marked effect in impending general business recovery. The rising trend of pig iron output has been checked and several blast furnaces have been compelled to bank through lack of fuel. Steel work operations have also been moderately curtailed.

The foreign trade statement for June was somewhat more favorable than for any preceding month this year. Exports valued at $334,000,000 exceeded any month since October last and compared with $308,000,000 for May and $336,898,606 for June, 1921. Imports at $260,000,000 compared with $254,000,000 in May and only $185,000,000 in June, 1921. For the fiscal year ended June 30, 1922, exports amounted to $3,770,000,000 as compared with $6,515,510,033 in the preceding fiscal year; imports were valued at $2,608,000,000 as compared with $3,654,459,346 for the fiscal year ended June 30, 1921. Allowance must be made for lower range of commodity prices this year of perhaps 10 or 20 per cent. For the fiscal year ended June 30, 1914, exports amounted to $2,364,579,148 and imports to $1,893,925,657. The excess of merchandise exports over imports this fiscal year was $1,162,000,000; for the fiscal year ended June 30, 1914, it was $471,000,000.

United States Steel Corp. reported net income available for fixed charges and dividends for the three months ended June 30, 1922, at $27,286,945 and the deficit for the quarter at $1,462,345. For the first quarter of the current year this net income amounted to $19,339,985 and after dividend deductions the deficit was $6,759,468; in the second quarter of last year income was $21,892,016 and the deficit amounted to $4,571,668. Unfilled orders on the books of the corporation as of June 30 totaled 5,635,531 tons, as compared with 4,494,148 on March 31, the end of the first quarter, and 5,117,868 on June 30, 1921.

"Survey" Puzzling Farm Tractor Makers

CHICAGO, July 24—A purported survey of the farm tractor industry of the United States, sent out from Minneapolis and St. Paul over the signature of the "Farm Implement Research Bureau" whose identity and place of business were not made known, has aroused considerable interest in tractor and farm implement circles here.

At the headquarters of the recognized national organizations of the industry, including the National Association of Farm Implement Manufacturers and the National Institute of Progressive Farming, it was said that nothing was known of such as organization as the "Farm Implement Research Bureau."

The purported survey, which painted a dark future for most of the tractor manufacturers, was mailed in plain envelopes on which there was no printing or writing other than the address to which it was sent. The survey was in typewritten form with typewritten signatures. A notice at the end stated that similar surveys would be issued later on other agricultural subjects.

G. M. STOCK OWNERSHIP

NEW YORK, July 24—At the end of the third quarter of 1922 the number of General Motors stockholders was 71,331 compared with 72,665 at the end of the second quarter and 70,504 at the end of the first quarter. In 1921 there were 66,837 at the end of the fourth quarter and 65,324 at the end of the third.

It is interesting to note the way common has stood up without a dividend. The count in 1922 runs 48,348 stockholders in the first quarter, 50,591 in the second and 49,725 in the third. In 1921 there were 43,001 for the third quarter and 44,640 for the fourth.

A. E. S. A. MEMBERSHIP GAINS

DETROIT, July 25—Backed by the efforts of the manufacturers of starting, lighting and ignition equipment, who have pointed out to their service representatives the value of membership in the Automotive Electric Service Association, the membership in that organization has grown from 62 at the annual meeting Jan. 31 to approximately 230 on July 1. The midsummer meeting of the governors of the association will be held in Detroit Aug. 11, at which time recommendations will be made for the consideration of the manufacturers at their summer meeting at Old Orchard, Me., Aug. 31.

FINANCIAL NOTES

Hayes Wheel Co. for the six months ending June 30, show a net of $544,321 compared with $269,682 for the same period of 1921. Total sales were $6,155,431, compared with $5,556,361 and gross profits $819,653 compared with $521,924. Net profits, after fixed charges, but before Federal taxes, for the first half of 1922 were $510,331 against $184,153.

Durant Motor Co. of New Jersey's 6½ per cent serial coupon bonds, totaling $3,500,000, have been purchased by S. W. Straus & Co., New York. The bonds, which are offered at par and accrued interest, are a first mortgage on all the property and equipment of the concern at Elizabeth, N. J., which represents an investment of $13,106,294.

Sears Tire & Equipment Co., Davenport, Iowa, has had a judgment of $31,228 entered against it in favor of Blunk & Joehnke, contractors. The lien is for construction of the company's factory on Rockingham road. The Scott County Savings Bank and Jansen & Ernst, contractors, are joint defendants with the tire concern.

Overman Cushion Tire Co., Inc., will hold a stockholders' meeting Aug. 7 to vote on a resolution to reduce the common stock, now consisting of 5000 shares, par value $100 each, to 2500 shares with the same par value; also to approve the authorization of 2500 shares of preferred stock to be known as ex-preferred.

The Autocar Co. has called for redemption on Aug. 21, 1922 at 102½ and accrued interest, all of its outstanding 6 per cent serial notes dated Sept. 1, 1921. The company's 6 per cent outstanding serial first mortgage bonds, dated April 1, 1919, are called for redemption at the same rate and time.

American La France Fire Engine Co., reports earnings for the first half of the year at the rate of 16 per cent on its $2,900,000 common stock, $10 par, selling around $13 and paying 10 per cent. All but about $20,000 of the $1,500,000 bonds have been converted into common stock at par.

B. F. Goodrich Co. shareholders at a special meeting authorized the issuance of $20,000,000 of an authorized issue of $25,000,000 of first mortgage 25-year 6½ per cent bonds. The bonds have already been sold subject to approval by the shareholders.

Stewart-Warner Speedometer Corp. reports that the Company's sales in the second quarter established a new high record, 10 per cent over previous record quarter a year ago. July sales are said to be running 50 per cent over July of last year.

Firestone Tire & Rubber Co. profits for the first eight months of the fiscal year approximated $5,000,000. Sales this year will materially exceed last year's figure of $66,372,000 and may approach 1920, which contained six good months.

Chandler Motor Car Co., Cleveland, reports net profits of $927,114 for the three months ended June 30, after allowing for all expenses, including charges and taxes. In the first three months of the year net profits approximated $850,000.

McCord Mfg. Co.'s financial affairs are reported to be improving so much that an extension proposition on remaining debts is being taken up with the creditors. The creditors' committee will be discharged soon.

Yellow Cab Mfg. Co., Chicago, reports net profits for the second quarter of $692,286, or more than double the dividend requirements.

Mack Trucks, Inc., will show earnings for the second quarter well in excess of the $255,197 net profits of the first quarter.

INDUSTRIAL NOTES

Moreland Motor Truck Co., Los Angeles, has selected Portland as its northwest headquarters to handle wholesale business for the entire Pacific Northwest. C. H. Smith, one of the pioneer Moreland officials, will be in charge of the branch as northwest manager. Simultaneously with the location of the branch there a local company to be known as the Moreland Motor Truck Co. of Oregon was formed to handle retail sales in this territory. The company is composed of F. H. Nash, C. E. John and W. M. Fried, all business men of Portland.

Briscoe Devices Co., Pontiac, Mich., reports demand for the Scoe carbureter has increased by 50 per cent over the high record of the spring. The production now is the greatest in the company's history. The Briscoe company increased its financial strength during the past winter by sale of an issue of stock, largely in the local field, and is prepared to handle the increase of business.

American Motor Body Co., Philadelphia, successor to the Hale & Kilburn Co., is now operating at 50 per cent of capacity, with the schedule to be gradually advanced until November, when it will be at 100 per cent. Night work is necessary at present in some departments. The company recently closed a contract with Durant Motors, Inc., for the manufacture of 50,000 car bodies.

Electric Storage Battery Co., Philadelphia, has opened several departments in its Crescentville plant, built at a cost of approximately $2,000,000 and will be operating it in full by October. It is now working at full capacity, with some departments operating on overtime schedules. It is employing as many men as it ever had and the outlook for new business is excellent.

Van Dresser Bros., Detroit, announce the termination of their contract with the International Purchasing & Engineering Co., Detroit, covering the sales and distribution of Van Dresser cylinder and reboring tools. In the future all sales, distribution and service will be handled by Van Dresser Bros. at 1157 Concord Avenue.

Jordan Motor Car Co. common stock has risen 135 points in one week on the Cleveland stock exchange following reports of exceptional business. Jordan reports a volume of about $1,500,000 in June, with a total running inventory of $700,000.

Jacques Mfg. Co., has been awarded the contract for the first unit of 2500 closed bodies for the Lexington Motor Co. The Jacques company contemplates a one-story extension of 200 feet to its present building.

E. Edelmann & Co., Chicago, manufacturers of automotive equipment, have started construction of a new plant at Logan Boulevard near Western Avenue, which will be ready for occupancy Nov. 1.

EMBEZZLEMENT CHARGED

ATLANTA, GA., July 22—Embezzlement of more than $90,000 of the funds belonging to the Oliver Rim Co. of Atlanta is charged to Elmer Oliver, founder and former president of the company, in an indictment that has been returned by the grand jury here. According to witnesses testifying before the jury, most of whom were stockholders of the company, the defalcations of Oliver will amount to twice the above amount.

Four British Firms Announce New Models

LONDON, July 18 (*By Mail*)—Four firms have recently allowed particulars to issue relating to entirely new models.

The Daimler Co. has put forward the smallest Knight-engined model it has yet produced, a six cylinder engine of approximately three liters, the bore and stroke being approximately 3 x 4½ in. It is the first monobloc Knight engine which the company has made. With a four-speed gearset and Lanchester worm axle, the chassis price is at present £750. Battery ignition is used for the first time.

Vauxhall

A recent introduction is the 23-60 hp. Vauxhall, which displaces the 25 hp. model and has the same bore and stroke, namely, four cylinders, approximately 3¾ x 5½ in. The engine throughout is entirely new, having overhead push-rod operated valves. Is said to develop 32 b.hp. at 1000 r.p.m., 47.5 at 1500 and 60 at 2000 r.p.m. The Lanchester Harmonic balancer is fitted for the first time to a four cylinder motor. This is a high-priced medium powered chassis, the chassis price being £850.

B. S. A.

It is known that the B.S.A. Co. in 1923 will standardize an 11 hp. four cylinder light car. This company re-entered the automobile industry at the end of last year with an air-cooled two-cylinder light car. The new model will be water-cooled.

Austin

The new Austin is to be something smaller than even the popular light car. It is to be termed the 7 hp. with a four cylinder engine of approximately 2⅛ x 3 in., giving about 42 cu. in. capacity. It is designed to sell in the neighborhood of £200. It has a three-speed gear-set in unit with the engine, plate clutch and spiral bevel final drive. Front wheel brakes are used in conjunction with internal expanding brakes on the rear wheels. Total weight is under 700 lb. with a body for two adults and two children or luggage. It is claimed to have a maximum speed of 45 m.p.h.

THE NEW EARL JOB

JACKSON, MICH., July 21—The new Earl cabriolet referred to briefly in these columns last week is a four-passenger model patterned somewhat after the Earl brougham model, but designed to sell at a lower price. It has two doors and the forward seats have folding backs, and are arranged to tilt forward. The upholstery and interior finish is grey Spanish leather. The top and sides of the upper body are covered with black Duratex fabric while the lower body is blue and the fenders black. A rear trunk platform is provided, located between the body and the rim carrier, the body being protected by natural finish maple slats. The weight given is 2780 lb. Standard equipment includes sun visor, windshield wiper and dome light, but trunk, bumpers and certain other items are furnished at extra cost.

METAL MARKETS

The traffic manager is a more important personage these days than either the sales manager or purchasing agent. It is the movement of steel from mills to consumers' plants which engages the attention of sellers and buyers to the exclusion of more than passive interest in prices that might apply to fresh buying if there were any. So far the chief artery of automotive steel supply, i.e., from the Pittsburgh and Youngstown districts to Detroit has been kept pulsating with relatively slight congestion of shipments. Indications of embargoes against diverse commodities are in evidence on less well equipped lines, and structural steel consumers in the South Atlantic division are resorting to motor truck transportation.

So far the larger steel mills have been able to maintain a very satisfactory flow of raw material into their plants, and what diminishment in the rate of operations is taking place is not so much to be ascribed to shrinkage of their coal piles and shortage of basic material as to lack of a sufficient quota of efficient labor and the seasonal inroads made upon efficiency of production by midsummer weather.

Some of the independent steel mills are substituting fuel oil for coal wherever possible. Steel producers mining their own coal are bending every effort to enlarge their output. All of these activities absorb the complete attention of executives, and it is a large question whether producers or consumers of steel are the more apathetic as concerns the market's future. Certain it is that automotive steel consumers have so far displayed not the least interest in fourth quarter offers, and, as a matter of fact, steel producers have not sought to stimulate this interest. Buyers are not even giving much thought to September. What they are perturbed about are August shipments.

Amid these conditions which give the right of way to immediate urgency a constructive price program for the remainder of the year is a difficult problem, and the most influential steel market factors are averse to hasty changes. Their conception of what is best for the market is apparently to maintain the prevailing schedule of quotations intact, and to await more definite developments as to the demand and to production costs before undertaking any revision of their attitude as to the adequacy or inadequacy of the prices now in force. Hardening of prices in the steel bar market denotes merely the continuing pressure upon the supply exerted by consumers in need of rush shipments, especially so of makers of cold-finished automotive bars. The best that can be said for prevailing quotations is that they are well maintained for nearby deliveries and that they have not yet been tested for deferred shipments.

Pig Iron.—Although the market rules quiet, it has an ominously strong undertone. Automotive foundries are watching the situation closely.

Steel.—There is virtually no change in the sheet market. Rollers of full-finished automobile sheets continue to enjoy a considerable backlog of orders. Some of the non-integrated interests experience difficulty in securing an adequate supply of sheet bars. Although the price for the latter is maintained at $35, several producers are restricting sales of sheet bars to the vanishing point, preferring to convert their entire output themselves. Cold-finished bar makers are confronted with similar difficulties in securing their hot-rolled raw material. Strip steel mills suffer more or less from fuel shortage.

Calendar

SHOWS

Aug. 4-13—Chicago, Aircraft Exhibition and Aeronautical Congress.

Aug. 26-Sept. 1—Toronto, Ont., National Automobile Show held in conjunction with the Canadian National Exhibition.

Sept. 4-9—Indianapolis, Automobile and Accessory Show in conjunction with the Indiana State Fair, Auto Show Building, under the auspices of the Indianapolis Automobile Trade Association, J. B. Orman, manager.

Sept. 23-30—New York, Closed Car Show, Grand Central Palace.

Oct. 21-28—Washington, D. C., Annual Closed Car Salon, Convention Hall, under the auspices of the Washington Automotive Trade Association.

Nov. 13-18 — Chicago, Annual Show and Meeting of the Automotive Equipment Association.

Dec. 3-9—New York, Eighteenth Annual Automobile Salon, Commodore Hotel.

Jan. 6-13—New York, National Automobile Show, Grand Central Palace, under auspices of National Automobile Chamber of Commerce.

Jan. 27-Feb. 3—Chicago, Annual Automobile Salon, Coliseum and First Regiment Army.

FOREIGN SHOWS

March 10-July 31—Tokio, Japan, Peace Exhibition.

July 1-24—London (Olympia), Aircraft Exhibition.

Sept. 1922 — Rio de Janeiro, Brazil, Automobile Exhibits in Connection with the Brazilian Centenary Associação Automobilista Brazileria.

Sept. 15-20—The Hague, Automobile Show.

Sept. 25-Oct. 3—Berlin, Automobile Show at the Kaiser-Damm Hall under the auspices of the German Automobile Manufacturers Association.

September — Buenos Aires, Argentina, Annual Exhibition, Sociedad Rural Argentina.

Oct. 4-15 — Paris, Automobile Show, Grand Palais.

Nov. 3-11 — London (Olympia), Automobile Show.

Nov. 10 - Dec. 19 — Brussels, Automobile Show, Palais de la Cinquantenaire.

Nov. 29-Dec. 4—London (Olympia), Cycle and Motorcycle Show. British Cycle Motors, The Tower, Warwick Road, Coventry.

November—Buenos Aires, Argentina, Annual Exhibition, Automovil Club Argentino.

CONVENTIONS

August 28-Sept. 2 — Detroit National Safety Congress.

Sept. 18-23, 1922 — Rome, Italy, Second Annual Meeting of the International Chamber of Commerce.

Sept. 13, 14, 15—Buffalo, Lafayette Hotel, Annual credit meeting, Motor and Accessory Manufacturers Ass'n.

Studebaker Quarter Brings Big Profits

DETROIT, July 26—Profits of $8,110,926 for the three months ended June 30, 1922, as against $4,575,836 in the first quarter are reported by the Studebaker Corp. After allowing for reserves, net profits were $7,086,552, against $4,059,848 in the March quarter.

This means a profit equal to $11.50 a share earned on the $60,000,000 common capital stock outstanding, after allowing for the regular preferred dividends, as against an earning equal to $6.49 a share in the first three months of this year. As the company is paying dividends at the rate of $7 a share on the common, the earnings for the six months were equal to more than two and one-half times the annual dividend requirements.

A meeting of the directors will be held next Monday, and it is expected they will either increase the regular dividend on the common or declare an extra payment for the quarter.

DISTEEL BRINGS SUIT

DETROIT, July 26 — The Detroit Pressed Steel Co., which manufactures Disteel wheels, has brought suit in Federal District Court at Chicago against the Forsythe Bros. Co. of Harvey, Ill., alleging infringement of patents Nos. 1,255,928 and 1,280,927, issued to Alden L. Putnam. The plaintiff states that the suit has been begun without malice and with no intention whatever of hampering the wheel industry in general. The Detroit Pressed Steel Co. contends that its patents are basic in the field of single disk steel wheels.

NATIONAL BODY SHOW PLANNED

NEW YORK, July 24—The Automobile Body Builders Association, with headquarters at 1819 Broadway, announces that its second national show will be held in the 12th Regiment Armory, Sixty-Second Street, west of Broadway, Jan. 8-13. The exhibits will consist of dump bodies and other heavy duty bodies, omnibuses, sight seeing buses, ambulances, light commercial bodies, closed passenger bodies, open passenger bodies as well as materials and parts entering into body construction, trimming and finishing.

Slight Decrease Seen in Canadian Exports

WASHINGTON, July 25—Automobile exports from Canada in June decreased 13 per cent in value compared to the May exports, according to figures furnished the automotive division of the Department of Commerce. The June exports were 2267 passenger cars, valued at $1,328,340, representing a decrease of 11.6 per cent in number and 11.5 per cent in value as compared to May. There were 170 trucks exported in June, valued at $74,047, a decrease of 32.3 per cent in number and 34 per cent in value. June exports of accessories were $100,877, representing a decrease of 11 per cent.

Australia, United Kingdom, South Africa, New Zealand, Sweden and British India, in the order named, were the principal countries of imports, Australia taking 805; United Kingdom, 368; South Africa, 267; New Zealand, 169; Sweden, 111, and British India, 76.

PLANS EXPANSION

DETROIT, July 26—Sales of Wills Ste Claire cars in the first six months of 1922 exceeded the sales for all of 1921, according to a statement by C. H. Wills, president of the producing company. A larger production than ever is being planned for August, September and the fall months, Wills says. Plants recently acquired by the Wills company are being equipped for production and will employ about 400 additional men. The company is now doing its own painting of phaetons and roadsters. To provide additional facilities for this work a building with 104,000 square feet of floor space will be erected at the south end of the present plant.

Steel Loading Block Helps Car Shipments

DETROIT, July 24—Motor Wheel Corp., Lansing, has brought out a steel loading block which is designed to facilitate the loading of automobiles in freight cars, and to take the place of the timber in which most cars heretofore have been cradled for transportation. Relative to the new block, President H. H. Harper of the Motor Wheel Corp. says:

Reduce Loading Cost

"Use of the Gier steel loading blocks by several car manufacturers has enabled them to reduce loading and unloading time and cost considerably, and at the same time has kept the cars secure from damage in transit. Following the unloading of the cars, the blocks are returned by the distributor or dealer and may be used over and over again.

"In a test made in the Buick yards, a freight car of automobiles anchored with Gier blocks was kicked against a string of thirteen empty box cars with all brakes set at a speed of 25 miles an hour. The double draft timber and the end of the box car were broken by the impact, but the automobiles were held by the block and were not damaged.

Weigh 10 Lb. Each

"The Gier blocks are 10½ in. high and stamped from No. 10 gage, blue annealed, pickled, oiled and limed stock. They weigh 10 pounds each and can be nested and returned to the factory in bundles of four or more by fourth class rating. The blocks average one and a half trips a month. Each is stamped with the shipper's name to prevent loss in transit.

"Tabulated figures show that the blocks earn their cost in five trips. Many letters from dealers express approval of their use because of the time saved in unloading and the fact that they prevent chafing of the tires. Railroads endorse them from a claim protection standpoint. They also lessen damage to the freight car floor."